ENGINEERING Library

THE HEATING AND VENTILATING MAGAZINE

A MONTHLY JOURNAL OF ENGINEERING PROGRESS

Vol. XVI. No. 11
$2.00 a year. 20 cents a copy

NOVEMBER, 1919

Published at Cooperstown, N. Y.
New York Office, 1123 Broadway

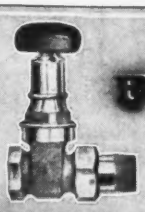
GURNEY HEATERS
FOR HEATING ANY DESCRIPTION OF BUILDING BY STEAM OR HOT WATER
GURNEY HEATER MANUFACTURING CO.
NEW YORK OFFICE 11 E. 42ND ST. 188-200 FRANKLIN ST. BOSTON.

MASON REDUCING VALVES
and other PRESSURE REGULATORS
for all conditions of service
MASON REGULATOR CO., 15 Medway St Boston Mass.
TRADE MARK MASON

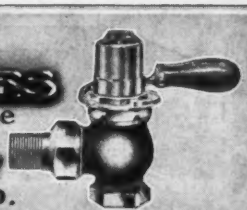
DAVIS VALVE SPECIALTIES
STEAM SAVERS SINCE 1875
PRESSURE REGULATORS, BACK PRESSURE VALVES, EXHAUST RELIEF VALVES, STOP AND CHECK VALVES, FLOAT VALVES, BALANCED VALVES, STEAM TRAPS AND OTHER VALVE SPECIALTIES FOR HEATING PLANTS
SEND FOR LATEST CATALOG
G. M. DAVIS REGULATOR CO.
436 MILWAUKEE AVE., CHICAGO

ROOM TEMPERATURES
Every Public Building Should Be Equipped With
BRISTOL'S
RECORDING THERMOMETERS
As a safeguard to health and sanitation. They prove to the heating engineer whether the proper distribution of heat is being maintained.
Bristol's Recording Thermometers can be supplied in many different types and finishes for any range desired.
Ask for Bulletin T-204
THE BRISTOL COMPANY Waterbury Conn.

ROSS
FEED-WATER FILTERS
Will Keep Oil Out of Your Boiler
Regulating Valves for Water, Steam, Air
Ross Valve Mfg. Co. Troy, N.Y.
Ask for List of Users



DOLE
BACKLESS RADIATOR VALVES
Insures Satisfaction. A Valve for every System. Write for Catalogue and Discounts
THE DOLE VALVE COMPANY
208 NORTH FIFTH AVENUE CHICAGO.



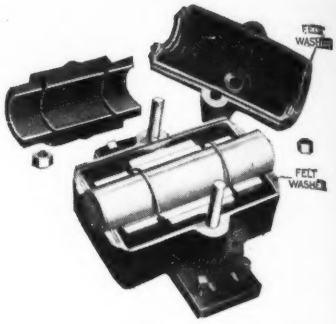
Entered as second-class Matter at the Post-Office in Cooperstown, N. Y

Copyright 1919 by Heating and Ventilating Magazine Co.

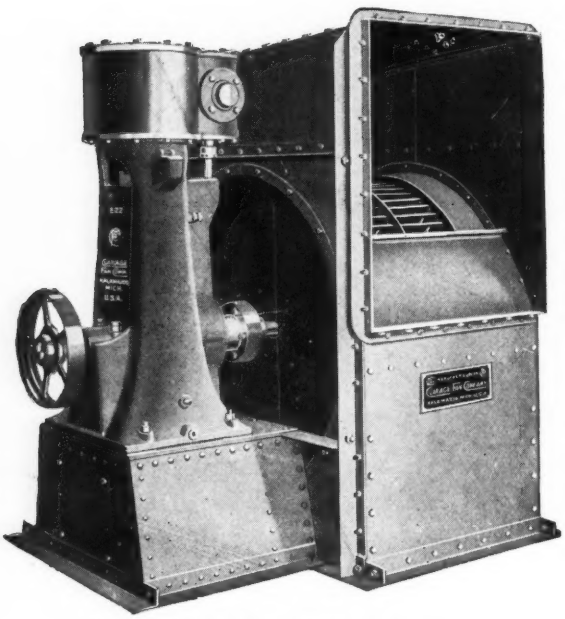
CLARAGE
KALAMAZOO

IF—

Clarage Multiblade Fans were not provided with Clarage Special Bearings, they would still be mighty good fans for heating and ventilating work.



Clarage Special Bearing



Clarage Multiblade Fan and Clarage Steam Engine

BUT—

because we furnish our Multiblade Fans with these Superior Bearings you are absolutely certain of dependable operation.

Good bearings are indispensable to good fans—the quality of a fan is dependent upon the quality of its bearings.

Study the illustration. The inner sleeves of the Clarage Bearing, with the special construction and the felt washer protection, are beyond the reach of the finest dust particles, no matter how hard and sharp. The same construction which keeps grit out, keeps oil in.

Our catalog H-51 describes Clarage Multiblade Fans. Write for your copy today.

CLARAGE FAN COMPANY
KALAMAZOO, MICHIGAN

Engineering and Sales Offices in Principal Cities

THE HEATING AND VENTILATING MAGAZINE

NOVEMBER, 1919

ERRORS IN ENGINEERING DESIGN AND OPERATION

Hints for Correct Practice, Based on Experience Plus Theory.

There are certain errors peculiar to engineering design and operation which may properly be brought to the reader's attention because of their oft repetition. These are usually made by those who though fully equipped with technical training are lacking the necessary practical experience. They may lay out the work on paper to show boilers of sufficient capacity, engines, pumps and auxiliaries of suitable size, and connecting piping properly arranged and distributed, but, unless viewed other than on paper, for clearances at all points as would the erector or operating engineer; the plans might fail to take care of certain features of impracticability. Some errors are so obvious as to warrant no mention, but upon second thought, why then do they occur? Doubtless the reader has had or knows of many an experience along these lines which would merit publicity and be of considerable help to others. It is interesting to note how apparently simple errors are made and they are sometimes more or less excusable, having arisen from a complicated situation or sequence of events.

DEVELOPING THE LAYOUT TO ELIMINATE ERRORS.

The best method for results and economy of time in laying out, is to cut to scale strips of paper labelled for each machine. These may be shifted about in relation to one another and the structure which houses them, until the best all-around scheme is developed when they may be pinned to the drawing. From this point the work may be developed to the finishing point.

CORRECT LOCATION OF OPENINGS FOR MACHINERY AND PIPES.

One error which is so obvious as to be frequently neglected through lack of attention to this detail, is the failure to provide doorways or other openings of sufficient size to admit boilers and machinery or to allow of their removal, as may be required at some future date. Again, window space or temporarily bricked-up openings are not always left for the drawing of boiler, economizer or heater tubes. Engines and, in particular, pumps are sometimes set back to back with insufficient space between for the removal of cylinders or pump plungers.

Openings, as per plans, left during building construction for breeching and pipes should be carefully checked for correct location with respect to connecting equipment. At the early stage of building construction mechanical equipment is being developed so that these openings are then indicated on the building drawings. The exact size of equipment and location and size of pipe out-

lets therefrom is indeterminate until bids are in and the particular manufacturer's boilers and machinery selected. This is the cause of many an error through failure to note that a slight change in size, etc., of one machine as then determined, involves a corresponding change at other points.

CAST-IRON SECTIONAL LOW-PRESSURE HEATING BOILERS.

In the use of cast-iron sectional boilers for low-pressure heating, space must be left overhead or at the side for the removable sections and water grate bars and at the rear of flue connections. Occasionally a cast-iron boiler will be installed in a buidling of height so great as to crack the boiler from static pressure. The water-line of the boiler selected will vary in accordance with its type, as cast-iron sectional or steel firebox. This is important, for the returns of a gravity steam heating system must necessarily be 18 in. or preferably 3 ft. higher than the water-line in the boiler. This may mean more or less excavation for the depression of the boiler-room floor. An instance comes to mind (Fig. 1) of a water-gage glass installed at such a high point that a high water-line resulted. This left but a slight steam space in the boiler so that the small amount of steam usually present would condense whenever the fire doors were opened. As a consequence, a partial vacuum would form and induce a rapid flow of the return water to the boiler and thereby cause an unsteady water-line. In some cases the latter may be due to several causes, one of which is shown in Fig. 2, the water-line being level with the upper return. Whenever the former drops below this level, there falls a rush of water, which fills the boiler, due to the emptying of the long horizontal run.

BOILERS IN GENERAL.

Boilers should be provided with sufficient firing space. They should be located approximate to coal pile and for the best handling of coal and ashes. While these points may be given the proper attention, the space back of the boilers may not. Blow-off piping takes up considerable of the space at the rear of boilers and without ample room is a handicap for access whenever a tube bursts.

An error is sometimes made in figuring the tube heating surface of water and fire-tube boilers, but need not be if one will but remember that in each case it is the surface exposed to the fire that is figured. It is the O. D. and I. D. outside and inside diameters respectively

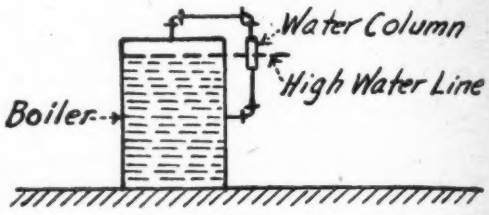


FIG. 1—UNSATISFACTORY WATER LINE CAUSED BY HIGH WATER COLUMN.

that enter into the calculations. The confusion probably arises from the fact the tubing is ordered by the O. D. while the pipe is ordered by the I. D.

FEED-WATER HEATERS.

The feed-water heater should be installed high enough above the boiler feed pumps. Pumping hot water has its difficulties, increasing with the temperature, where the lift is by suction. Water which will vaporize at atmospheric pressure should flow by gravity to the pumps. The air separating tank, used to receive the pump discharge in a vacuum system, should be set at a height sufficient for gravity flow to the heater, difficulties due to air binding and the discharge against pressure within the heater being taken into account. Drain outlets from heaters should be with visible discharge in order to make noticeable any excess waste of water to the sewer.

ERRORS IN HEATING INSTALLATIONS.

Frequently the expansion pipe in a hot water heating system is connected to the supply main and this results in bubbling or hammering in the expansion tank and a loss of steam vapors through the vent from the tank. The expansion pipe connected to the bottom of the tank should be connected from the return pipe of the nearest radiator or prefer-

ably from one of the return pipes at the boiler.

Ceiling coils should never be used for radiation where the headroom is limited. They are objectionable, due to radiation, on the heads of those who sit beneath them. Supply branches to such coils should be connected from the top of the steam main to prevent condensation from entering the coils. Each coil should be supplied through the end of a header on the longest side of the coil, the return being connected on the same side to the other header. Less short-circuiting of the steam through the pipes of the coil is secured than would otherwise be obtained. Furthermore, as each pipe coil pitches downward in the direction of its return end, it follows that the pipe forming the outer and longer side of the coil will be at the lowest point at that end. This, aided by the use of an eccentric fitting or reducing ell connected into the return header, allows for the complete drainage of the coil.

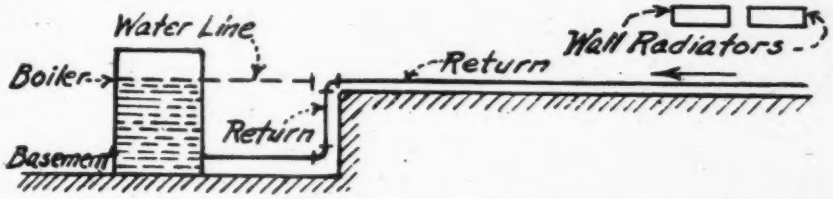


FIG. 2—A CONDITION CAUSING AN UNSTEADY WATER LINE.

DIFFICULTIES IN PIPING WORK.

Clearances should be noted at all points, in particular for massed piping and its fittings, so that these may be free from contact whenever their relative positions are changed, due to expansion and contraction. If detail drawings are developed of complicated piping, they will frequently show beforehand certain interferences such as that caused by the bonnets of large valves. Clearance should also be allowed for valve wheels when fully opened, with additional allowance for access to wheel. When the various kinds of pipe systems (heating, plumbing, sprinkler, etc.), are erected at different times by more than one contractor, as they usually are, the drafting of these detail drawings become imperative. It is often the practice to develop such drawings as the work progresses and it is then that difficulties are discovered too late for simple remedy.

Most difficulties encountered in piping installations are those caused by neglect to provide for proper pitch, expansion and contraction, dripping and avoidance of pockets. Frequently cold-water pipes where run through heated rooms (boiler and engine rooms) sweat from lack of some special anti-sweat covering. More careful consideration should be given to the selection of covering for all purposes of piping than is usually the custom. Hot-water pipes should not be laid close and beneath cold-water pipes, causing the latter to become slightly warm, otherwise a wastage occurs at cold water faucets when drinking water is required.

Pipe smaller than 3/4 in. should not be used, for allowance must be made for inside pipe corrosion, good drainage, pockets, sagging of pipe and mechanical injury. No traps or pockets should be allowed to form where reduction in the size of pipe are made. Eccentric fittings may be used or lines dripped at such points. Flanges and unions should not be omitted whenever their use will facilitate repairs to special fittings and pipes. It is a mistake to use galvanized pipe on steam work since the scale will loosen and lodge on valve seats. Plans should also be gone over with a view to further expansion so as to leave room not only for additional units but also for extension of pipes by leaving plugged tees at the proper points.

Openings for pipes should be large enough to pass the flanges on the pipe. Those between boiler and engine rooms should be closed with asbestos after the

pipes are in place. An engine room presents a poor appearance when smoke from the boiler room enters through the space left between the pipe and pipe thimbles and blackens the walls in streaks directly above these openings.

In schoolhouse installation appearance is important and piping necessarily exposed at stairways or other points should be furred in. The piping is usually single line and diagrammatic so that in one instance piping installed during the early stage of building construction was later found to be running through the glass transoms over doorways.

Headroom above the boilers is necessary in building design, otherwise steam leads may not be run high enough to prevent carrying over of water from the boilers, particularly when sudden demands are placed thereon by engines in intermittent operation.

A point sometimes overlooked is that piping is approximately sized by the inside diameter of standard weight pipe so that extra strong and double extra strong pipe is of smaller bore than that of standard weight, the O. D. in each case remaining constant. This should be taken into account when calculating the necessary size for close work with small pipes. Confusion sometimes results in ordering pipe since pipe of steel is now referred to as wrought, but this does not mean wrought-iron pipe. It should also be remembered that fittings are standard weight, medium or extra heavy, but that these terms do not apply to pipe, the correct terms for the latter being, standard, extra strong and double-extra strong. A grade below standard, known commercially as "merchant pipe," is now but seldom handled.

The words "blind" and "blank" are often erroneously used in connection with flanges. A blind flange is to close the end of a pipe, while a blank flange is not drilled but in all other respects is complete. The words "blank flange" are sometimes used to designate a pipe flange, which is not threaded, though this is poor usage.

LIBERAL USE OF VALVES ADVOCATED.

The liberal use of valves, especially with the smaller sizes of piping where the cost per valve would not be high, will often result in a decided advantage by securing amore flexible control of the system. In some plants, steam escapes day and night from numerous joints which cannot be repaired without shutting down for lack of valves properly distributed.

Gate valves should be given preference over globe valves as the latter, due to their interior web or diaphragm which is an integral part of a globe valve, impede the free drainage of the pipe and retard the condensation until the cross-area of the pipe is about half filled. If necessarily used, they should never be set vertically on horizontal pipes, but should be turned through an angle of ninety degrees so as to lie on their sides. In this position, they retain less condensation, but their use is still open to more or less objection, due to water leaking through the packing of valve bonnets. The only objection to gate valves is that when these valves start to leak, they are very difficult to repair, while in the case of a globe valve a new disc can be installed with very little trouble.

Another point, though probably not very important in low-pressure piping, is that globe valves should be set to close against the pressure. When set to close with the pressure they cannot be packed, furthermore should the disc become detached from the wheel, the valve could not be opened since the pressure would hold the disc to its seat. An arrow which indicates the proper position in which the valve should be installed in relation to the flow may usually be found on one or both sides of globe valves, etc., as well as on special valves and steam specialties of all kinds.

By-passes around reducing valves, traps, meters, etc., are not always provided. Accordingly such appliances are run as best they may, since the necessary attention which should be given them would result in greater inconvenience elsewhere. Important valves require by-passes and those on high pressure especially so for the partial equalization of pressures when opening the valve. It is also advisable to install valves and meters in duplicate. A by-pass to the sewer should certainly be

provided at the vacuum pump. It is in particular desirable when in starting up a new or idle system, the returns are wasted until all impurities and foreign matter have been drained from the system.

A strainer is essential to the maintenance of clear water passages and valves in the pump, the area of its opening being four times the area of the suction line. Duplex or twin strainers are the more desirable though of considerable additional expense. The use of these insure steady operation since the water may be by-passed through one part while the other part is being inspected, otherwise there is a tendency to neglect the strainer, allowing foreign matter to accumulate, with consequent detriment to the proper operation of the pump.

HEATING WATER BY WASTE GASES.

Heating water by means of waste gases is most economical. The heat so reclaimed in a smoke breeching is a by-product unless the draft is no more than sufficient, in which case the extraction of heat (upon which the draft depends) will defeat the purpose of the chimney. An actual instance of this was observed in a laundry where the cold-water supply pipe to the hot-water tank was run in the breeching and chimney. After this doubtful installation was made, it was found that the chimney draft was considerably depleted, enough so that it became necessary to install a small fan for forced draft under the grates. The layman who perpetrated these two deeds, having in mind that the piping itself did not appreciably restrict the flow of gases, could only with difficulty see any relation between the two incidents.

BLOW-OFF PIPE SHOULD HAVE OUTLETS AT SAFE POINTS.

In the design of blow-off pipe too little thought is given to the point of discharge as regards safety. If to tidal waters its end should be submerged, if open at grade to the atmosphere in isolated localities it does not follow that some one, sometime, will not get in its path when blowing-off. A boiler house in a certain locality had a number of suction, drain and other pipes laid inside of a large steel plate pipe from the river. It was entered at rare occasions, possibly once in several years, by a workman or trouble hunter. On one of these occasions a workman narrowly escaped being scalded since neither he nor the engineer knew that the blow-off pipe leaving the boiler room merely entered the tunnel and did not extend as did the other pipes to the river.

Vapor pipes from returned tanks, blow off tanks and feed-water heaters should be separately extended through the roof, since blowing down of the boilers, especially with more than one boiler and a temporary stoppage, might cause blowing back through these pipes. If drain and other piping, for the sake of economy, must be connected to the blow-off, then each so connected should be equipped with a check valve. Such checks in vertical pipes will offer a slight resistance to passage of vapors and must be so located that no condensate will accumulate above them to keep the valve closed. There is also a further possibility of freezing.

TAKING CARE OF HIGH TEMPERATURE WASTE WATER.

Local ordinances usually require that some form of condensing tank or coil must be used for all water at a temperature over 130° F. when discharged to the sewer. High-temperature water causes offensive odors and expansion and contraction of underground lead-calked pipe joints and, where tile pipe is used, the latter is apt to become cracked. Further, the pressure within the system may force the seals of various plumbing fixture traps, thereby allowing the entrance of sewer gas into the buildings. These things must be borne in mind not only with blow-off piping but also with the waste piping of hot-water service heaters, low-pressure boilers and like apparatus. Blowing-off piping, where the water is inclined to foam from the presence of impurities, should also be designed to include the necessary surface blow-offs.

MAKING SAFETY VALVES SAFE.

Safety valves are not safe in all senses of the word, if as more com-

monly installed, their discharge is made open without piping to above the roof. They may, and have caused reinforced concrete roofs to fall from corrosion of the reinforcement and sprinklers heads to operate from the increase of temperature which is always high in itself when near the roof line. A foolish, but nevertheless actual occurrence, due to a temporary man in stress of circumstances, was that where the discharge of a safety valve was piped by this man back into the boiler. He objected to the labor of maintaining the pressure, the annoyance of valve popping and consequent wastage of steam. Needless to say the valve no longer popped with the pressure from the boiler equalized on both sides of its lift. What might have happened if his invention had not readily been detected, is not hard to guess.

TROUBLES WITH OIL SEPARATORS.

A frequent trouble with oil separators is imperfect drainage, or in the use of an oil which is too volatile, thus allowing some to go through the separator without striking the baffles at all. The baffles should be frequently cleaned, and the efficiency of the oil separator should then be from 95 to 99% elimination of the total quantity of oil used. A good practice with separators is to make these one size larger than the pipe line in which they are installed. This gives more storage space to prevent the carrying over of water which may at times be received in slugs. A connection to the atmosphere should always be made beyond the oil extractor on exhaust pipes so that the oil will not be blown into the atmosphere with the exhaust steam.

OPERATION OF BOILER PLANT.

In the operation of boiler plants there are any number of things which may be incorrectly done. Feed-water heaters are of cast-iron and therefore limited in the pressures they will withstand. Occasionly the float valve will stick and someone will lift it by hand so as to admit water which, being at city pressure, will burst the heater before the overflow trap can afford relief. A similar and equally bad practice is to by-pass or so work a steam trap that high-pressure steam from drips will blow directly into the heater.

It is an error to use too many makes of valves in the piping system, since this involves more than one kind of repair parts. The steam fitter can do better work where his familiarity is limited to but one make of valve. Leaks often occur in the bonnets of valves at radiators or elsewhere and are very annoying since the repairs usually made are not adequate, as, for instance, the use of a wrench on valves that leak unless tightly closed. Valve stems so treated become bent and when operated work the packing loose. Leaks in steam mains may short-circuit electrical connections. They also cause doors to swell and damage the adjoining woodwork.

In starting up a heating system, leaky joints are sometimes caused by the admission of steam too quickly into the main, causing water hammer. The latter is peculiarly violent when steam is admitted suddenly to a cold vacuous pipe, because there is no air to cushion the blow. The remedy is slow admission until all pipes are brought to an even temperature.

It is not uncommon to find belts from motors to fans, or elsewhere, running with the flesh side next to the pulley rather than the hair or smooth side. The latter is harder and able to stand the wear of the pulley while the cramping of the belt does not cause it to crack as does the reverse method. It is the belt arc of contact with the pulley that transmits the power and this is furthered by contact with the smooth side so as to increase the suction. To illustrate; in the handling of large plate glass, it is the practice to paint a cross on one piece as a warning against placing of another on top. The suction between the two is great, the atmospheric pressure exerted over their large area holding them together with considerable force. That the correct manner of running belts is not always understood, is evidenced by the practice of some manufacturers who stamp their belts with the words "This side next to the pulley."

FINISHING DETAILS.

Finishing details though eventually required and necessary to operation are matters looked upon as minor and are often neglected. They involve boiler, pump and engine trimmings, such as gauges, gauge light, lubricators, drip pans and air vacuum chambers at pumps and ladders for access to boilers, headers, feed water heaters and walkways.

The proper selection and installation of indicating and recording instruments for the plant is a subject which is seldom given but a passing thought as compared to the operating apparatus, though nevertheless a deciding factor in the recording of operations, also in the finish and appearance of the plant. All instruments, particularly when mounted upon the same board, should be carefully considered for their external features having in mind that instruments for varied purposes can not always be had from any one manufacturer. They should be with standard depth cases, uniform in size, design, materials and finish; those having the name of the manufacturer in raised or large type upon the front of the same are detrimental to the good appearance of the board. Dials 8 in. in diameter, with round form iron cases and nickel plated O. G. rings, are more generally used.

Plant piping diagrams that are frequently consulted soon became worn and smeared. The best way is to locate them in a handy place under glass and mount on a movable inclined pipe frame at a height convenient for consultation.

Circular meter records are difficult to file, especially so when in assorted sizes. A neat filing cabinet should be made in which spindles are placed, one for each meter record with discs or spools to hold the records in place. Large, white, distinctive lettering placed underneath each file of charts will indicate clearly and readily the nature of their services.

THE COAL SITUATION FROM THE OPERATORS' POINT OF VIEW

A Survey Made Shortly Before the Inauguration of the Coal Strike.

BY J. D. A. MORROW.

Vice-President, National Coal Association.

(Presented at the annual convention of the National Association of Purchasing Agents.)

In many respects the present coal situation is primarily due to a lack of team work between the buyers of coal and the producers. I am speaking of bituminous coal. In part, at least, the position we are now in is largely because of the failure of many buyers of coal to inform themselves accurately as to the conditions—and let me say that it was not impossible for them to get the information. They might have found out if they had taken the pains to do so, but they were content to think they knew.

Their position, as I see it, has been analagous to that of corn speculators last July, who sold July corn short at the price of $1.98. They were confident the price of corn was going down, simply because the war was over. It turned out the fact that the war was over was not the determining factor in the price of corn. If those speculators had taken the trouble to go out to the farms, to the men who were producing it and buying and selling it among themselves, they would have discovered that at the very time they were contracting

to deliver corn in advance at $1.08 a bushel, it was then being bought at $1.75 a bushel by the men who produced it.

LACK OF ANALYSIS OF COAL SITUATION.

In part we have had exactly the same kind of a lack of analysis of the coal situation in the United States. In this particular instance it would not have been sufficient to have stopped with a mere analysis of conditions in the United States, because we have become definitely a part of the world fabric of industry, and our coal supplies have become a part of the world coal supply. The purchasing agent who wishes to advise his concern accurately with regard to the outlook for coal supplies and coal prices would necessarily have to know something of world conditions regarding coal supplies.

WORLD SITUATION WITH RESPECT TO COAL.

Consider the world situation with respect to coal. Of all the nations engaged in the war, there were just two whose coal supply increased or maintained itself during the war—all the others went off. The United States increased her output and Germany kept hers up. Before the war Great Britain was producing 287,000,000 long tons per year; she will be lucky this year to produce 215,000,000 long tons. In other words, her coal production has dropped off 30%. The French production dropped from 45,000,000 to 30,000,000 tons. The Austrian tonnage went off by 40% and the Russian tonnage a like amount. The production of the United States increased from about 450,000,000 tons in 1914 to 580,000,000 tons in 1918. We were the one nation that made a great advance in output.

With the closing of the war, the signing of the armistice, and the beginning of the resumption of international trade, and with the participation of the United States purposefully and actively, under the direction of the government, in attempting to rehabilitate Europe, to give her food and fuel supplies, it is of importance to know how Europe and the United States stand today with regard to coal production, stocks and supplies.

CONDITIONS IN EUROPE AND UNITED STATES COMPARED.

In the year before the war, Great Britain was producing 287,000,000 tons of coal. She was exporting 77,000,000 tons. This year, as I said, England will be lucky to produce 215,000,000 tons. It is estimated that she may get out 224,000,000 tons and that she will have available for export—or that she will export, whether she has it available or not—23,000,000 tons.

Germany, before the war, produced 192,000,000 tons. Her production this year, since she is losing the Saar fields, will not be greater than 92,000,000 tons. Before the war she exported 23,500,000 tons. This year she is called upon, by the terms of the Peace Treaty, to export over 48,000,000 tons of coal, and she cannot humanly export that tonnage.

Canada, before the war, produced 14,000,000 tons. She exported 2,000,000 tons. She will produce and export this year just about what she did before the war. The United States has been supplying Canada with approximately 16,000,000 tons a year, and we will have to furnish it to her this year. Throughout the war, under the Fuel Administration, Canada was treated exactly as if she were one of the States, so far as coal supply went.

I shall not go into detail regarding all the smaller nations. France, it is expected this year, with the addition of the German production she will gain, will produce 46,000,000 tons as against 41,000,000 tons in the year before the war, and that she will have to have 17,000,000 tons from outside sources. Belgium will require 12,000,000 tons, the Netherlands 8,000,000 tons from outside sources. The total—and these are official figures which have been compiled by the United States Shipping Board—indicate that the world needs from some source or other 82,000,000 tons of coal.

DEFICIT MUST BE MADE UP BY UNITED STATES.

The pre-war exports of the United States were 19,000,000 tons. If we export no more than we did before the war—16,000,000 to Canada and 3,000,-

000 to Central America, West Indies, South America and the Mediterranean —Europe would still be short some 62,000,000 tons of coal. There is only one source from which coal can be obtained to fill that deficit, and that is the mines of the United States.

At the present time the primary limitation on exports of coal is simply and solely ships. The ocean freight rates for coal from ports of the United States to Europe range from $22.50 to $31.00 a ton. Nevertheless, in the face of these shipping rates, the lack of coal is so severe that we will probably export this year 8,000,000 tons of bituminous coal to Europe, and next year, if there are ships available, we will have to export a much larger tonnage.

What has that to do with the situation in the United States? Eight million tons of coal is only a drop in the bucket in our production of over 500,000,000 with our capacity of 700,000,000 tons of production. But that production comes from certain districts, and those of you whose coal supplies come from those districts are very definitely and directly concerned in that export movement. The fact that we must look ahead to more or less increased export demand, and that the coal industry of the United States is looking ahead to possible competition with Great Britain for some important share of the 77,000,000 tons of export coal that England shipped before the war, is a matter of concern to you.

Our condition in the United States, of a present and prospective shortage of coal, is simply part and parcel of a world shortage. It is peculiarly unfortunate that we should have a shortage in the United States, for we are the one country that has the mines, the machinery, the men and the transportation to avoid any shortage, that has available a large surplus of coal for shipment abroad for storage reserves against the winter.

CAPACITY OF MINES NOT UTILIZED.

Now that capacity hasn't been utilized. Why not? It is partly psychological and partly, as I said before, a lack of team work. During last year you were all urged to buy coal early and store it, to get your reserves in—and you did. The United States was better equipped for the winter a year ago than it was ever before in the history of our nation.

When the war was over, you had the same kind of reaction that most of us had; a sort of letting go and the feeling: "Well the war is over; now there will be plenty of coal."

Many of you expected the price of coal to go down, and it was an expectation rather than a definitely analyzed and supported condition. Naturally your concerns wished to use up the stocks of coal which they had purchased at high prices. I am not going to find fault with the commercial policy involved in that sort of decision, but I think we would all be better off if the buyers and sellers of coal had been able to get more closely together, with a more definite understanding of the conditions, than they seem to have had.

BUYERS OVERWAITED THE MARKET.

Let us take the case of the man who expected the price of coal to decline. What reason did he have for it? I take it that he had about the same kind of reason that those corn speculators had who sold July corn short last February—that the war was over, the demand had slumped, and the price ought to go down. He was right in part and the prices did decline. They were lower in January than in December, lower in February than in January, and on April 1 they were substantially lower, in nearly all districts, than the maximum prices set up by the United States Fuel Administration.

They were also under those prices in May, June, July and up to the first of August, and, in several districts, they are still below those figures. But the purchasers of coal who waited for a decline, over-waited the market, in plain English.

ANALYSIS OF COST OF PRODUCTION OF COAL.

Let us see how much justification they had for expecting any serious decline in the price of coal. There are plenty of official figures on the cost of production of coal, analyzed by items of cost, and from those analyses it is pos-

sible to ascertain that labor cost is 70% of the cost of producing coal. If you took the labor cost entering into the supplies that go into the production of coal, you would find that in the aggregate the total percentage of labor cost in the production of coal is about 80%.

What chance was there for that 80% of cost to shrink? If you had cared to find out, you would have learned that the wages in the bituminous industry—and in anthracite, also—were fixed, until the proclamation of peace, by a joint agreement between the President of the United States, the mine workers and the mine operators. There was no human probability of any decline in wage cost in the production of coal. That meant that 80% of the cost of coal was nailed to the wall—would not slump.

So far as the remaining 20% went, the royalties on the production of coal are fixed charges; you can't shrink them; they are set per ton. The interest on bonds is a fixed charge. The overhead is pretty much of a fixed charge. You were perfectly competent to judge how much decline might be expected in the price of supplies—iron, steel, copper and all the various supplies that have to be used in the mines.

If you had made such an analysis and had added one other consideration to it, you would have pretty well understood the situation. That other consideration is the fact that maximum prices fixed for coal during the war were cost-plus prices. Dr. Garfield had most comprehensive reports of the cost of production from the various fields, which were sent to the Federal Trade Commission, edited and sent back to his department. Those costs of production were charted for the different fields, and an arbitrary profit per ton was added to that cost, which would be necessary in each field to get out the tonnage that the Fuel Administration felt must be produced from that field. That meant that a sufficient profit was given the coal producer to stimulate production.

When the war was over, production did not need to be stimulated, but a very large part of the production had to continue when we didn't need to increase it any longer but did need to maintain most of it. The production from the high-cost mines might reasonably be expected to cease. But with that information in your hands, with that sort of consideration of the question, you might reasonably come to the conclusion that while there would be some decline in the price of coal there would not be any very material decline.

The production of bituminous coal is practically unlimited. There are now about 10,000 mines open; some 6,000 different producers. There are hundreds of thousands of acres adjacent to railroads from which coal mines can begin producing on short notice, with limited capital investment. We have a substantial, unlimited potential production of bituminous coal. In three months last year we produced coal at the rate of 670,000,000 tons a month, and for one week we went at the rate of over 700,000,000 tons. That is what the bituminous mines can do; that is the capacity you have to draw upon.

It is a fundamental law of prices—an economic law—that where you have an unlimited production and open competition, as you do have in bituminous coal with 6,000 producers and 10,000 mines and unlimited opportunities to open more mines, you cannot have a combination that will work under such conditions as to keep up prices or restrict competition. The continuing condition in bituminous coal is that it has never been an industry in which large profits could be obtained. What profits have been made in the main in the bituminous industry have been made out of the appreciation of the coal lands, not from the mining operations themselves.

That is the condition of affairs, so far as price factors go in the bituminous coal industry. These were the facts which any purchaser of coal could have discovered for himself. Nevertheless, the fact remains that the production of coal slumped; it was behind last year's production week after week, from the first of the year. The National Coal Association's board of directors, at a meeting in Chicago, considered that whole matter and they were distinctly concerned at the condition that confronted the industry and the country. It was evident to those men

that if the purchasers of coal continued to delay buying they would never be able to get their supplies this year, simply because it woudl not be physically possible to mine and transport the tonnage they would ask for.

Accordingly, our board of directors said: "We will place these facts, as far as possible, before the public," despite the fact that those reports had already been made public by official agencies of the United States Government. Our association spent $100,000 in three weeks' time, simply publishing official statements about the coal supply and the prospective shortage.

I am glad to testify that advertising pays. Orders came in to the mines, production jumped from 8,500,000 tons a week to $10,500,000 tons a week. It was maintained at that figure for a very short time and then the production went off again, but for a different reason. It was no longer the indifference of the buyer; it was the inability of the railroads to furnish cars to the mines. That is still the limiting factor.

After the orders had come into the mines and, in response to those orders, the production began to flow, the railroads were not able to transport the coal. That was a condition the men in the coal industry had expected, had foreseen, and there were good reasons for that expectation. In the first place, it was possible to find out what was being done with regard to keeping coal cars in repair. That is a factor in a sufficient car supply. You could have found out just as well as we did.

Under good railroad practice, not more than 4% or 5% of steel, open top cars are ordinarily in bad repair. But on the fifth of April, when this record of ours began, the United States Railroad Administration had 6½% of its coal cars in bad order, and that percentage steadily increased until, by July 5, it had gone up to 10½%. On that date over 100,000 coal cars were not fit to load coal. There ought not to have been more than about 40,000 of those cars in that condition.

THE CAR SHORTAGE.

You will recall that the shopmen's strike occurred about the first of August. I point out this record of bad cars in order that you will understand that this present condition of shortage of cars did not happen overnight. It was not a thing which it was impossible to foresee. The evidence was all in front of anybody who cared to find out.

When the Director General of Railroads was called before the Senate Committee investigating this matter, he admitted that there was a shortage of coal cars; he conceded that if the expected demand for coal continued during this year, we might expect more car shortage or a continuation of it. He assured the coal operators and the Senate that he would do all in his power to remedy that condition, but that we had to look forward to some limitation on production, simply because there would not be transportation available to haul the coal.

COAL REQUIREMENTS WILL AMOUNT TO 11,000,000 TONS PER WEEK FOR REMAINDER OF YEAR.

Along in June, Dr. Garfield obtained from the Geological Survey an estimate of the coal requirements for this current year. That estimate called for a production of 500,000,000 tons of bituminous coal this year. We have steadily run behind that figure. In the middle of September we were 99,000,000 tons behind the production of 1918. We will have to have a production each week during the remainder of this year of about 11,000,000 tons, if we are to go through the winter without any serious shortage. There has been only one week since the beginning of the year that the production of coal has reached 11,000,000 tons, and every other week it has been less than that amount.

During April and May as much as 40% of the capacity of the mines was idle for lack of orders. Coal mines are not like factories—they cannot produce coal and store it at the mines for shipment at a later day.

CURRENT BUYING OF COAL MAKES UNEQUAL PRODUCTION.

We have been accustomed in the United States to buy most of our coal currently, as we need it. That makes

an unequal kind of production. We have a maximum demand and a maximum output in winter, and a minimum demand and minimum production in spring, but mine capacity and railroad capacity must be available to carry the peak.

The industrial consumer of coal can do much to equalize that production, if he will buy a part of his year's reserve—stock that he ought to have in hand as an assurance against interruption of supply during the winter—and take that coal during the spring and early summer. He will normally find that he can buy at an advantageous price, he will stimulate production at a time when it is needed, he will be helping the railroads and the mine operators of the country, and will get better service in his coal supply than is otherwise possible to get. In the long run it won't cost any more than it does in the present way, and he will have the coal. As it is now, he doesn't always get it.

THE DEMANDS OF THE BITUMINOUS OPERATORS.

You have doubtless seen the demands that have been made of the bitmuinous operators by the United Mine Workers. They are asking for the nationalization of the mines. They want six hours a day, five days a week. In other words, thirty working hours per week instead of forty-eight, and, as I understand it, they expect to ask a wage increase to cover the difference in working time, so that their earnings will be just as much in thirty hours, or possibly more, than they now are in forty-eight hours.

Now, I don't know what the outcome of these negotiations will be, nor do I care to express any opinion, but I rather expect that before we get done with it you will find some increase in the cost of coal. For that reason, I fully believe that those who neglected to buy coal in April, May, June and July of 1919, missed a chance to buy the cheapest coal they will ever have a chance to buy again. Let me make clear the fact that this increase in price will not be due to any exorbitant profits on the part of the mine operators. They are not in a position to exact exorbitant profits. Competition is probably keener in that industry than in any other. It is really unlimited competition.

POSSIBLE TO OVERCOME SHORTAGE.

In the Pittsburgh district of Western Pennsylvania, one of the greatest coal-producing districts in the world, the average cost of production as a whole for last year, under the control of the United States Fuel Administration, was $2.06 a ton. The average price which the operators in that district realized on all the coal they shipped during 1918—this covered coal shipped on old contracts made at higher than Fuel Administration prices—was $2.48 a ton. That gave a margin of 42 cents, and the figure of cost I mentioned—$2.06—did not include any interest on the capital invested.

Those are the cost figures as ascertained by the Federal Trade Commission. They left a margin of 42 cents a ton on the capital invested. It paid 6½% during the first six months of 1919.

Those are the conditions in the bituminous coal industry. We have a prospect of shortage, which isn't an absolutely impossible situation to overcome. We can get out enough coal this year to meet the demands of coal users in this country and to ship abroad all they want; but it is going to take team work between the buyers of coal, the Railroad Administration and the coal operators.

CONSERVATION OF ENGINEERING MATERIALS BY THE PREVENTION OF CORROSION

Recent Developments Indicating the Commercial Possibilities in this Direction.

Engineers and others connected with power plants and the equipment of buildings will find much to interest them in the rapid developments recently made in prolonging the life of materials that are subject to the destructive effects of corrosion.

For a number of years theorists have been working on the problem of the prevention of corrosion, with the great object in view of preventing the return of iron, steel and other useful metals of commerce to their original, or oxide, state, from which they are extracted at such enormous expense of labor and materials.

Up to the present time these endeavors have been largely along the lines of the use of non-corrosive or corrosion-resisting coatings. In this way we have all become familiar with the various processes of galvanizing, enameling, plating, painting and otherwise coating the more corrosive metals with the lesser corrosive ones, or with pigments and other non-corrosive coatings.

ALL METALS CORROSIVE.

Since all metals are corrosive, however, and since, in a great majority of instances, the more non-corrosive coatings are unsuited or unstable for use in the protection of the materials in power plants and in the mechanical equipment of buildings, more attention has recently been paid to the elimination of corrosion by other means.

CORROSION IN HOT WATER PIPING.

One very important example of corrosion is found in the hot water piping of our modern buildings. We are only beginning to realize fully the extent and meaning of the wanton destruction which is continually going on in connection with this particular item. With all the modern plumbing appliances and requirements and with the continual increase in the size and number of apartment houses, hotels, office structures, Y. M. C. A. buildings, clubs, baths, hospitals, public buildings, institutions, baths, etc., the quantity of hot water piping and other hot water equipment installed has increased to an enormous extent.

That this hot water apparatus is subject to more rapid corrosion than most other items of the building equipment is a well-known fact among engineers. It is also well known to the owners and operators of buildings that this corrosion not only causes very rapid deterioration and failure in this apparatus, but entails a very considerable portion of the cost and worry incident to the operation of the building.

THE RED RUST NUISANCE.

Where iron or steel pipe is used for hot water distribution this corrosion not only causes much material damage and inconvenience, but is responsible for the red rust nuisance so prevalent in domestic hot water service. This red rust discoloration is most marked in soft, or aerated, water districts and is, of course, a very practical evidence that the material of the piping and other apparatus is being carried away in solution with the water.

The use of piping and other hot water apparatus made of brass, lead, zinc, copper or similar materials practically eliminates discoloration, but fails to effectively meet the material destruction problem. This is partly on account of the excessive cost of these materials over the cost of iron or steel and partly on account of the fact that these materials crystallize or go into solution in the water, with the result that their total destruction is effected at about the same cost rate as iron or steel.

ENORMOUS LOSS THROUGH CORROSION.

It has been estimated that there exists about $500,000,000 worth of hot water piping and apparatus in the United States, and that about $25,000,000 worth of this corrodes away every year. The increasing demand for and cost of such materials has aroused general interest in the prevention of as much of this waste as possible.

RUST PREVENTION AS A COMMERCIAL PROPOSITION.

This problem has been attacked by a number of chemists and metallurgists and some of the remedies devised are now finding their way into practice and into the hands of our commercial engineering organizations. One of the first of these to come to our attention as being made use of in a practical and comprehensive way consists in the deactivating of the water, for the hot water service of buildings, etc., by eliminating the corrosive elements from the water before passing same to the system.

It is a well-known fact that the principal corrosive element in ordinary service water is the dissolved free oxygen which is present to the extent of from 5 to 10 parts per 1,000 parts of water by volume at normal service temperatures and pressures. This varies somewhat with different waters and is larger for soft surface waters than for hard ground waters.

Two other corrosive elements occur to a lesser degree in most waters, namely, carbon dioxide and hydrogen sulphate, but these have been found to be comparatively negligible, as far as the corrosion of pipes, etc., is concerned. All of these free dissolved corrosive gases are held quite firmly in solution so long as the water remains at a constant temperature and pressure. Their corrosive activities, therefore, are quite limited in the cold water piping of a building or in other instances where the temperature and pressure remain constant from the time the water enters the system until it leaves. Raising the temperature or decreasing the pressure of water after it has entered a system reduces its solution capacity for these dissolved gases, and as a consequence, they are set free to a greater or less extent, depending upon the degree of change in temperature and pressure.

These corrosive elements, when set free in this way, are much more active and tend to cause rapid corrosion of the pipes or other metallic parts with which they come into contact. It is for this reason that the hot water systems of buildings, the tubes of boilers and other such items exposed to water, which is continually taken into these systems at a comparatively low temperature and then raised to a much higher temperature, show such rapid deterioration, unless some effective means are used to prevent corrosion.

PRACTICAL METHODS FOR REMOVING CORROSIVE ELEMENTS.

As already stated, one of the most self-evident and efficacious methods of overcoming such troubles is to remove the corrosive elements from the water before it passes to the system. This is done in practice in one of three ways:

1. By preheating or boiling the water in open heaters or under a vacuum.
2. By chemical treatment.
3. By first passing the heated water over large surfaces of comparatively cheap and easily replaceable metal, and allowing the water to expend its corrosive activity upon this, instead of upon the materials of the piping and other parts of the system.

Developments made within the last few years tend to show that this latter method is the one destined to come into general use. Reduced to its simplest form the apparatus required consists of a storage heater filled with sheet metal. The water, after being heated by the coil in the heater, or by the fire in the case of a furnace heater, comes into direct contact with this excessive metallic surface, and if the design of the apparatus is correct for the rate of water flow, temperature changes, analysis of the raw water used, etc.. all of the free corrosive gases will be eliminated by this metal before the water leaves the heater.

Having once expended its corrosive activities at the point of its highest temperature there is no danger of the

water having any more corrosive effects at a lower temperature and upon the same kind of materials in other parts of the system.

The products of the corrosion in a heater tank such as this will, of course, in time begin to pass through to the system and show discoloration in the water. This is easily overcome by filtering the water which is then delivered to the supply mains clear, sparkling and free from corrosion. Being once in this condition it remains so to the furthest extremity of the system, as the elimination of corrosion in the pipes prevents the red rust discoloration after once the system is in condition and kept properly operating.

WINTER BUILDING THE ANSWER TO THE YEAR'S CONSTRUCTION DELAYS

Notes on Proper Heating of Materials and Water for Cold-Weather Work.

On the verge of winter, construction blocked in hundreds of cities, a shortage of many materials of construction and of labor and yet withal, an acute shortage of homes, offices, stores and in many cities, of office buildings, factories and warehouses—what is the answer?

After a study of the situation, A. E. Wells, president of the Wells Bros. Construction Co., whose articles on the "cost-plus" contracts have attracted wide attention, says that the answer lies in winter construction, in proceeding with work during December, January and February, which have been normally "closed" months. Winter work is not new. It has been practised for years, its safety adequately demonstrated, its economy proved. It should be more generally practised.

Any owner who, through prosecuting work during cold weather, can get occupancy of factory or warehouse or can lease apartments, offices or store space on May 1, stands to gain far more than the added costs of winter work.

Not only the owner, but builder, engineer and architect, gain. There is financial loss to the contractor who breaks up his trained organization, only to build it again in the spring. New men must take time to accustom themselves to working together and owners pay the bill in increased costs. Architects' and engineers' offices are frequently idle through much of the winter. Building superintendents have nothing to do and owners pay for unproductive overhead.

Perhaps the best way, then, to reduce the cost of building is to keep architects,' engineers' and contractors' forces busy twelve months of the year.

WHY DOES CONSTRUCTION STOP IN WINTER?

Primarily the reason why building has been inactive is that concrete does not harden so rapidly when its temperature hovers near freezing. But we heat our homes, offices and stores and coal is a comparatively small operating cost. We are to-day able to enclose a structure, warm it with simple coke stoves, heat aggregates prior to mixing with Portland cement, and keep the concrete or mortar warm until hardening has occurred.

Without these precautions, cold weather work is impossible but the precautions are simple and reasonably inexpensive. Why not do the logical thing and consider the winter as an open season for all but the most exposed class of construction.

Mr. Wells states that his organization has continued to lay brick and place concrete under zero temperatures even in the northern cities of Canada. A part of our normal equipment is sufficient tarpaulins to enclose practically any structure and sufficient salamanders or coke stoves to keep such enclosures warm. Boilers of any type, frequently those used to furnish steam for hoisting, supply live steam for heating aggregates and water and for thawing snow and ice from forms and reinforcing steel.

While a heavy snow may temporarily delay the delivery of materials, yet deep snow is seldom encountered. It is temperature alone that commonly hampers work, and temperature need not be feared.

PLANT LAYOUT FOR COLD-WEATHER WORK.

In laying out a plant for handling concrete in winter, or where the work is likely to run on into winter before completion, there must be provision for the proper heating of materials and water. In case of sand and gravel in open storage piles, it is only necessary to lay a grid of steam pipes under the material piles and place a tarpaulin over the pile. From one main through the center, branches should extend in both directions every six feet. These branches should be drilled with 1/8-in. holes spaced about 18 in. apart. Several hundred yards of material stored in one pile can be heated in this way with the steam from an ordinary hoisting boiler. Several days prior to concreting, steam should be turned into the pile during working hours which will be sufficient, except at times of extreme cold to maintain the necessary temperature.

When material is stored in bins, a series of pipes should be laid on the floor of the bins, feeding from a main pipe at the top of the sloping floor. Steam radiates through the entire contents of the bin and if a canvas cover is pulled over the top when work is stopped at night, the material will retain its heat, except in very cold weather, when a small amount of steam may be needed at night.

It is necessary also to heat mixing water and a steam line running directly into the water tank is the customary way; a 1-in. line being sufficient to heat water for a one-yard mixer.

But concrete poured into forms exposed to cold would lose its heat before hardening had progressed sufficiently. Forms must therefore, be protected and the most satisfactory means is a complete canvas enclosure, with salamanders or coke stoves to maintain a temperature of 45° or over, within. Several hours before concrete is poured, salamanders are started in the story below the forms, unless that story is already heated. Immediately after pouring, a sufficient number of salamanders is placed above the new concrete to insure its safe and thorough hardening. These will furnish heat for the floor above.

This method of enclosure and heating necessitates that the form work for the floor above that being poured shall be in place, in order to serve as a roof under which concrete may be kept warm; although in the case of steel frame structures, it may be possible to support canvas upon the steel because of the floor above.

Forms for the story above are supported as usual, upon posts, but since the floor slab of the story supporting these posts is not yet poured, it is customary to set the posts upon concrete blocks of the proper depth so that upon pouring, the block becomes a part of the finished floor. This requires setting blocks to grade and finishing their upper surface.

It is of course, necessary that the workmen be watched somewhat more carefully on winter work. Snow or ice in the forms is detrimental to good work. Careful inspection is necessary at every stage of the work, but slipshod methods are probably no more likely to effect quality in winter than in summer.

Where the enclosure in canvas is comparatively complete, workers operate at practically normal efficiency, but there are some delays likely to occur through slow delivery of materials during periods of snow. Yet the added costs are more than compensated for by the certainty of quicker occupancy and reduction of interest on money tied up in the incompleted building.

The Rise and Fall of the Industrial Conference.

The Industrial Conference, convened by President Wilson and from which so much was expected, came to an untimely end after a session of less than three weeks. The final split was over the question of collective bargaining which was voted down by the employers and was followed by the withdrawal of the labor group from the conference. Reference to the proceedings of the conference shows that this vital matter was presented in a number of different ways. The principal objectives of the employers to the proposition as presented was expressed by Harry A. Wheeler, chairman of the Employers' Group, whose statement follows:

1. Matter was brought before Conference prematurely.

2. Resolution is ambiguous and capable of inconsistent interpretation.

3. Each individual establishment should set the questions of employment relative between employers and employees of establishment within such establishment.

4. Group approves shop organizations in which representatives of management and of men in establishments, selected in each case from their own number, meet for discussion of all phases of employment relation.

5. Resolution recognizes right of workers to join labor and trade unions, but excludes right to join shop councils in individual establishments.

6. Resolution recognizes right of government employees to join unions which may control action of members against Government.

During the conference an important statement of principles which should govern employment relation in industry was presented by the Employers' Group, which are given herewith:

1. Production. Management and men should recognize obligation to improve and increase quantity and quality of production. No intentional restriction of productive effort or output by employer or employee to create artificial scarcity of product or labor.

2. *Establishment as Productive Unit.* Establishment rather than industry as whole or any part of it should be considered unit of production and mutual interest for employer and employee. Each establishment should develop contact and interchange of view between management and men, through individual or collective dealing, or both.

3. *Condition of Work.* Conditions under which work is carried on should be as safe and satisfactory to workers as business permits, and each establishment should endeavor to make employment stable.

4. *Wages.* Efficiency of worker and wage standard of industry in locality should be taken into consideration in determining wages, which should be sufficient to maintain satisfactory standard of living. Profit sharing, bonuses, etc., are matters to be worked out by individual establishments. Women should receive equal pay with that of men for equal work, and receive same opportunities for training and advancement.

5. *Hours of Work.* Standard of work schedule should be the week, overtime should be avoided, and one day of rest in seven provided.

6. *Settlement of Disputes.* Each establishment should provide for prompt discussion of all disputes, but management should not limit or impair its essential function of judgment and direction.

7. *Right to Associate.* Workers have right to associate voluntarily for accomplishment of lawful purposes, but such association does not involve right of compulsion over those not desiring to act with them.

8. *Responsibility of Association.* There should be no exercise of power without responsibility. All associations should be subject to public authority.

9. *Freedom of Contract.* Every person must be free to engage in any lawful occupation, only qualifications lying in power of State, for promotion of health, safety and morals.

10. *The Open Shop.* There should be no interference with "open shop." Employers should determine whether shop should be "open" or "closed."

11. *The Right to Strike or Lockout.* In such matters, distinction should be drawn between employment relations in private industry, in public utility service, and Government employment, two last to be considered from different points of view. Modern life demands unimpaired operation of public utilities, and continuous administration of governmental activities imperative. Sympathetic strike is indefensible, anti-social and immoral, as are blacklist, boycott, and sympathetic lockout. Right to strike or lockout is, however, not denied.

12. *Training.* Plans should be inaugurated in industry for training and up-grading of workers, adoption and adaptation of apprentice systems, extension of vocational education, and other adjustments making workers more effective.

THE HEATING AND VENTILATING MAGAZINE

A Monthly Journal of Engineering Progress

Member of the Associated Business Papers Inc.
Member Audit Bureau of Circulations.

Vol. 16 November, 1919 No. 11

Published Monthly at Cooperstown, N. Y. by the

Heating and Ventilating Magazine Co.

Executive and Editorial Offices, 1123 Broadway New York

A. S. ARMAGNAC ..... *President*
GUSTAVE PETERSEN .... *Secretary and Treasurer*

A. S. ARMAGNAC, Editor
GUSTAVE PETERSEN, Business Manager

European Representative
W. G. HOLLINGWORTH, 304 High Holborn: London, W. C.

Subscription	$2.00 per year
Canada	2.25 " "
Foreign Countries	2.50 " "
Back numbers	25 cents each

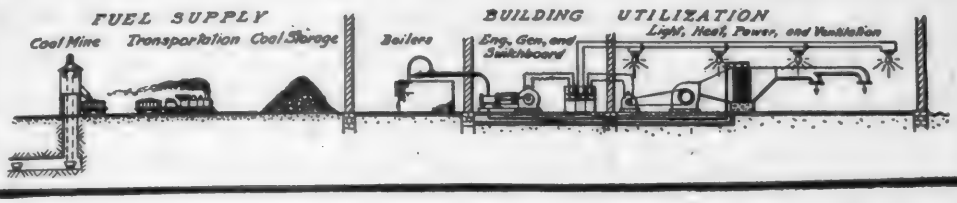
ALTHOUGH the movement for the co-ordination of engineering societies has been under way for some time, engineers as a body are just waking up to its significance and to its possibilities in connection with the present industrial condition of the country. They are just beginning to realize that the inauguration of the movement is not something that can be considered leisurely and possibly arranged for at some future time, but that it has a vital bearing on the immediate future and must be entered into at once if the engineering world is to take its proper place in the post-war reconstruction era.

The point has been well made that ours is an industrial civilization in which the engineering phases are of no less importance than the civil phases. In civil life the lawyers have long been represented by their bar associations and the merchants by their chambers of commerce. Up to the present time, however, there has been no similar national organization of engineers. It is further pointed out that such an organization is necessary not only to promote the interests of the engineer in all cases where his services should be sought, but that it should go still further and maintain standing committees to make regular surveys of engineering needs. This, in itself, is a project with vast possibilities. It would mean an engineering budget for the country that would fit in perfectly with the "National Budget" plan now before Congress.

Those behind the movement are already past the preliminary stages and are prepared to offer a definite program of co-ordination. There is to be no preliminary disintegration of existinging engineering organizations, although it is stated frankly that that would be the ideal way to handle the situation. Instead, it is proposed to establish a "National Council of Engineering Societies," made up of delegates from all the different organizations, the number from each society being proportionate to its membership. To give an idea of the power of such a body, statistics show that in the New York metropolitan district alone there are now eighteen engineering societies whose membership totals no less than 12,500. "If we can get that bunch together," declared one advocate of the plan, "they will represent one of the largest organizations in the country." They would not function as, say, "The New York Engineering Society," but rather as "The Association of Engineers of the Metropolitan District," banded together for a distinct purpose and so organized as to leave their professional interests in the hands of each society, as before.

The movement is progressing along the right lines and the call will come to each individual engineer perhaps sooner than he anticipates to cast the die for the new order.

POWER PLANT ENGINEERING



IMPROVING BOILER ROOM PIPING CONNECTIONS

The engineer operating the boiler plant has his daily problems which consist not alone in keeping the fires up and the coal bill down but in maintaining the piping with its steam specialties in proper working condition.

One appliance which may work poorly under certain conditions is the reducing valve. It is sometimes located in a boiler room and supplies a main of insufficient size, which therefore must pass the required quantity of steam at high velocity. The resulting friction causes a decided drop in pressure and this in turn produces a varying or insufficient pressure at the service outlets with additional difficulties due to moisture in the steam. Conditions are not uniform since the drop in pressure varies with the demand.

From the foregoing it will be seen that the remedy is to install the valve not in the boiler room but just before the first service connection where it will reduce to the pressure for which it is set and maintain that pressure constantly. The advantage of this location is in the carrying of steam at a higher pressure and a relatively smaller volume. Furthermore, a smaller size of steam main can be used, thereby reducing the cost of piping, valves, fittings and covering, labor and maintenance, as well as the amount of surface from which heat can be lost by radiation.

Under some conditions, it may be advisable to locate the valve where it is readily accessible to the engineer in the boiler plant. Future service outlets may be planned at points close to the plant or the first service connection may be nearby and the run short.

PIPING CONNECTIONS TO ELIMINATE ERRORS IN GAUGE READING.

Directing the reader's attention now from reducing valves to steam gauges, it is in order to point out how these may falsely indicate the pressure under such conditions of installation as shown in Fig. 1. The gauge is connected to the bottom of a steam main at the point where it rises and where the water of condensation collects. This having no outlets creates a head of 4 ft. 7 1/2 in. which acting on the gauge causes it to read (4 ft. 7 1/2 in. × 0.434 lbs.) 2 lbs. too high. However, with the connection made as shown dotted, the main could be maintained free of condensate by an occasional opening of the pet cock at the gauge. As now connected this piping fills up too rapidly for a correct reading to be obtained.

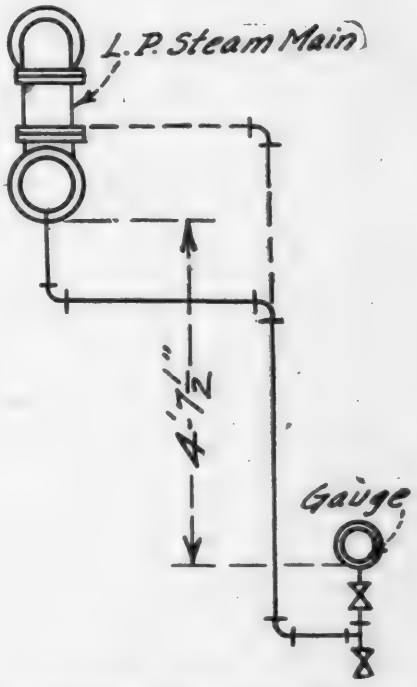


FIG. 1—WRONG AND RIGHT METHOD OF INSTALLING PRESSURE STEAM GUAGE.

Where the height of water column from condensation is a constant, then a gauge will always read higher than the actual steam pressure by an amount equal to the static pressure. In such cases, the hand may be adjusted to allow for this head so as to read zero with no steam pressure in the main.

A condition which will throw the mechanism of a pressure gauge out of adjustment is that wherein a vacuum is set up in the main to which the gauge is connected. This vacuum may be produced by the condensation of steam within the main after further steam

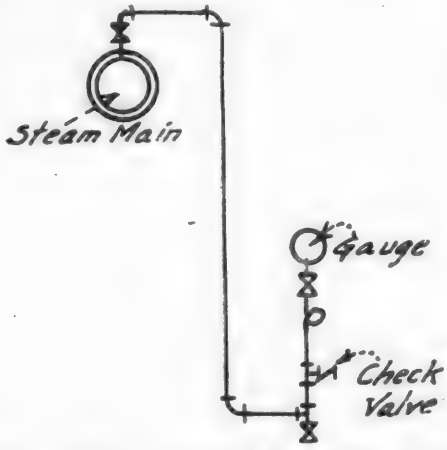


FIG. 2—CHECK VALVE IN PRESSURE GUAGE LINE ADMITTING AIR WHEN A VACUUM IN MAIN WOULD INJURE GUAGE.

has been shut-off when making repairs to piping. If the gauge registers pressure only, it will not indicate below zero since the pointer is stopped at that position on the scale by the usual small peg. This retention of the pointer at pressures below gauge is not desirable and may be remedied as shown in Fig. 2 where the small check valve automatically opens to the atmosphere and admits air to break any vacuum within the main.

CONNECTION AT STEAM TRAPS.

Steam traps do not always function properly and possibly that is the explanation for the many different kinds which may be bought on the market. This is not a criticism of any particular make of trap but rather an expression of opinion that the ideal trap is still to be perfected, and until it is, new betterments or departures from those preceding will be constantly brought to our attention as the last best coal and time saver.

Sometimes the difficulty is not with the trap but rather with the method of making connections to the return header, somewhat as shown in Figs. 3 and 4. In Fig. 3 the return header is connected to a number of branch returns which are close together and in which the pressure may vary at times to a slight extent. Those from the nearest radiator having the higher pressure will discharge freely and back up those from the more distant points. Fig. 4 shows how this difficulty may be overcome through the use of "Y" fittings which increase the circulation in the less favorable returns by suction The branch with a higher pressure, in discharging, produces an effect upon the others which is somewhat similar to that of an ejector. A further advantage may be secured by making the return header large so as to equalize to a certain degree the pressures and thereby produce better results.

PAINTING VALVES DISTINCTIVE COLORS.

Quite frequently the valve arrangement in the boiler plant is as important or more so than the preceding items. For quick and intelligent operation, it is desirable that the numerous valves be conspicuous and their interrelation thereby quickly grasped. This is in particular a necessity with the grouping of small size valves where the system is complicated and may be accomplished by painting the piping black, with the valves brought out in light green or red. The painting and distinguishing of valves is becoming a common practice and where formerly it was thought advisable to partially conceal piping and ceiling coils by painting them in harmony with adjacent woodwork, now instances may be observed where these are brought out in brown and the valves in gold. The appearance is brighter and more cheerful while the dust upon the surfaces does not show up so prominently.

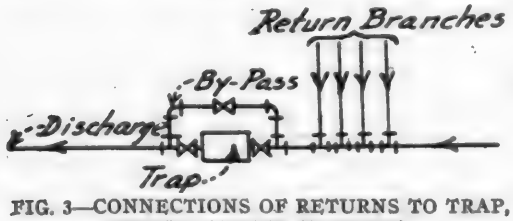


FIG. 3—CONNECTIONS OF RETURNS TO TRAP, WHICH CAUSED TROULBE.

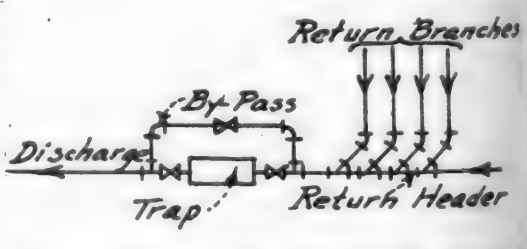


FIG. 4—REMEDY FOR TROUBLE AT CONNECTION OF RETURNS TO TRAP.

While in general it is desirable to conceal piping by painting, furring in or running in hung ceilings, still there may be occasions when this expenditure is not justified by the conditions. Often it is only the experienced eye of the architect or engineer that perceives and is annoyed by the failure to use aesthetics in the runing of a pipe. The ordinary layman is not trained to observe such matters and quite frequently is entirely unaware of their existence. As an example of the foregoing, an engineer in a certain hotel asked various non-professional men and women while dining in the hotel if they would kindly look about the room and note a defect in its construction or finish. In this they failed and instead were wont to comment favorably upon the architectural treatment. Now what the engineer had in mind was an overhead 6-in. neatly-covered steam main which ran lengthwise of the room near one wall. It was painted to conform with its surroundings and was not visible to those who came to dine and who observed only the general features of the room and not its details.

DRAINING BACK-PRESSURE VALVES.

Another feature of the boiler plant is the dripping of back-pressure valves and exhaust

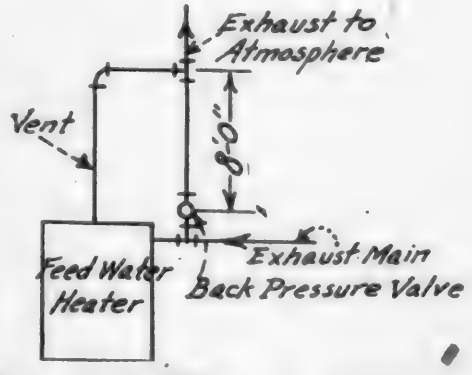


FIG. 5—CONNECTIONS AT FEED-WATER HEATER WHICH RESTRICT OPERATION OF BACK-PRESSURE VAVLE.

heads. The proper method involves certain points which are sometimes overlooked, an instance of oversight in this connection being shown by Fig. 5. The vent relieves air binding in the feed-water heater, but will as connected, result in condensation filling the pipe for 8 ft. and this static pressure may be sufficient to keep the valve closed unless dripped. One remedy other than dripping is to drill small holes in the seat of the valve to relieve air binding and drain back the condensate.

Frequently, steam leaking past a back-pressure valve forms a static head and corroding the valve parts cause them to stick. If the

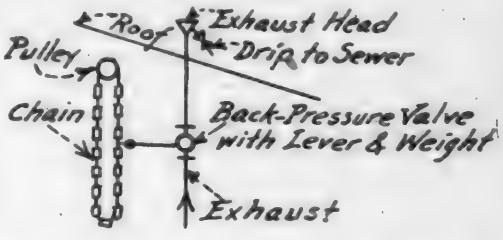


FIG. 6—OPERATION BY CHAIN TO PREVENT BACK-PRESSURE VALVE FROM STICKING.

valve is not dripped, the arrangement shown in Fig. 6 will obviate this condition. By operating the chain a few times each day the valve is manually opened and the condensation drained back, thus maintaining the valve parts in proper working condition.

New Method of Heating Buildings.

A new scheme for heating building, described as the application of the "aerofoil" theory was advanced recently by Professor G. H. Bryan, speaking before the British Association at Bournemouth. He said that while working at the mathematical theory in connection with aeroplanes the idea of the aerofoil theory occurred to him, and the results obtained had agreed with the theory far better than had been anticipated.

His proposal, he said, was to place over every radiator in a public or private building a deflector, arranged at an angle determined by experiment. Without the deflector the hot air from the radiator was drawn up towards the window and so passed away from the interior of the room. But with the deflector in use the hot air was passed from its underside into the room in a free stream, while the mass of cold air between the outer side of the deflector and the window formed a non-conductor and prevented the hot-air from escaping through the window to the outside.

It was essential, he said, that the deflector should have a sharp edge, so as to secure a free stream of hot air; with a rounded edge eddies of hot air were produced which did not carry so far into the room.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

ENGINEERS FACE TO FACE WITH A NEW ERA IN ASSOCIATION WORK

Co-Ordination on a National Scale the Goal of the Immediate Future, as Outlined at Opening Meeting of New York Chapter.

Co-ordination of the engineering societies of the country on a national scale, not in the distant future, but as part and parcel of the present reconstruction era and having an important bearing on the solution of the present industrial problems, was proclaimed at the opening meeting of the New York Chapter to be the most pressing need of its kind now before the engineering world. The possibilities in such co-ordination were outlined at length by J. N. Castle, secretary of the Engineering Symposium movement. He was followed by Charles Ferguson, author of "The New Machine," who delivered an impressive address on the causes and final solution of the crisis now being experienced in the world's affairs.

Mr. Castle started out by saying that engineers are not free from the unrest that is troubling the country. The rank and file feel that something is wrong. Already the civil engineers have appointed development committees to bring the general policies of the society more in trend with the times.

While Capital and Labor, said Mr. Castle, have heretofore been the vital factors in the situation, we must now add Management, and management means engineering.

Ours is an industrial civilization, and in this civilization we have the professional phase and the civil phase. The professional phase may be further divided into the national phase and the local or sectional phase.

There are now no less than 600 technical societies in the country, of which the first 200 may properly be considered in any broad movement of co-ordination. Estimating these societies as numbering 150,000 members with dues ranging from $12.50 to $15.00, it means a total of $1,000,000, which is an indication of the financial strength of these bodies if united.

As matters stand at present the four founder societies have a joint development committee which has worked up a program for bringing together the engineering profession. The plan is for the various societies to maintain their present organization. It will not be possible, therefore, to unite in one society, although co-operation could nevertheless be carried to important lengths.

The present joint conference is the nucleus of what will become a National Council, comprising representatives of all the different societies in proportion to their membership.

Probably the more efficient way would be disintegration of the present organizations, but as Mr. Castle pointed out, this is not considered possible and the present plans do not contemplate such action.

Mr. Castle maintained that no one is better fitted to speak on civil matters than the engineer. He is accustomed to give judgment on facts and he can do this in civil matters as well as in his particular line of work. The lawyers speak through their bar associations, the merchant speaks through his chamber of commerce or his merchants' association. Why, therefore, should not the engineer have a similar body through which he can make his influence felt?

In New York alone there are 18 engineering societies with a membership of 12,500. If we can bring these men together, said Mr. Castle, it will represent one of the largest organizations of its kind in the country.

Mr. Castle cited the case of the New York-New Jersey vehicular tunnel as a project that should have been worked up by engineers instead of their being called in after the general scheme was well developed. He said he would like to see, not a New York Engineering Society, but an Association of Engineers of the Metropolitan District banded together for a distinct purpose. He thought it would not be difficult for the members' professional interests to be taken care of in such an organization by leaving such interests in the hands of their own societies. In operation, the activities of any one section should be open to other sections. Local sections could amalgamate and have a general secretariat. The professional interests

would remain in the hands of each section. As to finances Mr. Castle suggested a pooling of resources.

THE INDUSTRIAL WORLD AS THE SOURCE OF POWER.

Mr. Ferguson's address was a thoughtful analysis of the real cause of the industrial problems that are confronting us and their solution. One statement he made apropos of a co-ordination of association work was that in connection with such a movement standing committees of engineers could be established not only to make a survey of the engineering needs of the day but could keep a continuous record of such needs for the guidance of the public and to their own benefit.

Although we are passing through a momentous crisis in this country to-day, said Mr. Ferguson, we have not yet come to the all-important thing. We have yet to grasp the idea that our future depends on the development of social organization for the purpose of the mobilization of creative force. We must do everything to stop what opposes the creative process. The industrial system, then, is of paramount importance. We are about to see the "Rise of the Creative System," while "big business" and "old politics" must go into the discard.

In connection with the dawn of the new era, continued Mr. Ferguson, we have got to understand that power is derived from the people. After all, the Constitution sets the source of sovereignty at the source of power and this power is now the industrial world. Industrial organization, he declared, is the source of all power on earth. We are today witnessing the banding of elemental force into industrial power and the industrial system will be sovereign.

The engineer, he said, is vitally connected with this great fact and will have his place in the development of the coming "business government." The present Industrial Conference in Washington, he added, will not solve the problems that are facing us because they are not to be solved along the lines of Capital and Labor. Something far more elemental is at stake.

In opening the meeting, which was held October 20 at the Building Trades Club, President Perry West spoke of the new spirit that was pervading the engineering world and which was being felt in the chapter. He said the four most important things before the chapter were (1) the job of making the chapter what it should be in relation to the society; (2) making the engineer the power and asset that he should be. The country, he said, is crying out for the engineer to step in and take his rightful place. We must have production but it is for the engineer to achieve the proper kind of production; (3) dissemination of engineering knowledge so that the user may know how to get his money's worth out of engineering equipment; and (4) getting the engineer ready for the reconstruction era. We have not come to the real reconstruction work yet, said Mr. West. We have not started to pay the cost of the war. We have yet to reach production at top speed with consumption less than production.

Mr. West then turned over the meeting to W. H. Driscoll who acted as chairman of the evening. Before introducing the topic of the evening, Mr. Driscoll spoke of the industrial unrest. He said that while the engineer has contributed greatly to the progress of the world, such efforts have been individual rather than collective. The opportunities for service are greater now than ever before. We must first break down the hard shell of conservatism with which engineers have surrounded themselves. He said the speakers would tell how this could be done through co-ordination of engineering work.

Mr. Driscoll then introduced Mr. Castle, while Mr. Ferguson was introduced by Mr. Champlain L. Riley.

PROGRESS OF THE SOCIETY'S RESEARCH BUREAU.

Director John R. Allen of the society's Research Bureau was then called on to tell of the progress of the bureau to date. Professor Allen commented on the preceding addresses, stating that it should be borne in mind that the motive behind the creative agency mentioned by Mr. Ferguson was the engineer. The trouble has been that engineering has not had a general organization to make itself felt. He then told of the accomplishments of the "Minnesota Joint Board," made up of the engineering organizations in that State. While the engineering societies have confined themselves to technical problems the joint boards have interested themselves in civic matters generally. It could be easily seen, he said, how a joint board, such as that in Minnesota, could be expanded into a "National Joint Board."

On the subject of research work, Professor Allen said that one of the first things being undertaken was the assembling and analyzing of existing data on direct radiation. The usual coefficient K, he said, is supposed to cover both radiation loss and convection loss. In the case of an exposed pipe along the wall, he said, the radiation may be 80% and the convection 20%, while in the case of a standard floor radiator, it would more likely be 40% radiation and 60% convection. It is necessary, therefore, to determine

whether we want to heat by radiation or convection. Another question is how much of the radiant heat passes through the surfaces to the outside air. This, he said, depended upon the temperature of the heated medium, as it is possible for radiant heat, at a high temperature, to pass through several thicknesses of glass.

In connection with ventilation, the bureau is taking up the matter of infiltration and determining on measuring methods. Professor Allen also said that the presence of "fresh" air does not constitute ventilation. Moreover fresh air is not needed necessarily for our lungs but for the temperature regulation of the human system. A man may get along with one lung, but if half his skin were to be removed, he would die. The air introduced, then, is for dilution purposes to take care of bacteria, dust and odors. The factor of circulation is most important and this has its effect through the skin.

Other speakers were President Timmis of the heating engineers' society, who advocated co-operation with the founder societies, Homer Addams, J. A. Donnelly, P. H. Seward and Frank K. Chew.

Eastern Pennsylvania Chapter Hears Talk on "Manufacture of Wrought-Iron Pipe."

At the opening meeting of the Eastern Pennsylvania, Chapter, held October 9 at the Engineer's Club, Philadelphia. N. Bowland of the A. M. Byers Company, gave a talk, illustrated with motion pictures, on "The Manufacture of Wrought-Iron Pipe."

The chapter has issued a program of its meetings for the winter. All meetings will be held at the Engineers' Club, 1317 Spruce Street, Philadelphia, on the second Thursday of each month and will be preceded by dinner at the club at 6:30 p. m.

For the November meeting (November 13) the subject is "Mechanical Stokers," illustrated with lantern slides and the speaker is H. F. Lawrence, mechanical engineer, American Engineering Company.

In December (December 11) the chapter will hold a joint meeting with the local section of the American Society of Mechanical Engineers to discuss "Oil as a Fuel," also illustrated with lantern slides. The principal speaker will be Henry Thomas, combustion engineer, The Sun Co., Philadelphia; and E. H. Peabody, vice-president of the Babcock & Wilcox Co., New York.

The remainder of the program is as follows:

January 8: "Air Cleaning by the Cottrell Electrical Precipitation Process," illustrated with motion pictures and lantern slides. Speaker, P. E. Landolt, of the Research Corporation, New York.

February 12: "Construction of the U. S. Government Explosives Plant at Nitro, W. Va.," illustrated with lantern slides. Speaker: W. H. Driscoll, vice-president of the Thompson-Starrett Co., New York.

March 11: Annual meeting for members only. Election of officers, followed by address of Dr. Edward J. Cattell, statistician, City of Philadelphia.

April 8: "Economizers," illustrated with lantern slides. Speaker, M. C. Sherman, mechanical engineer, The Green Fuel Economizer Co.

May 13: "Design of Large Boiler Plants," illustrated with lantern slides. Speaker, J. Grady Rollow, combustion engineer, E. I. du Pont de Nemours & Co., Wilmington, Del.

Kansas City Chapter Elects Officers and Discusses "Aerology."

"Aerology, the New Science," was the subject of an address by Dr. E. V. Hill, chief of the Ventilation Division of the Chicago Department of Health, at the opening meeting of the Kansas City Chapter, held October 3 at the University Club, in that city. Dr. Hill offered the term "aerology" as a substitute for "ventilation," aerology more accurately defining the science in view of the developments of recent years. He pointed out how the present conception of what is necessary for the proper ventilation of a room differed from the former ideas of "crowd poison" and the bad effects of carbon dioxide. He exhibited a number of large "synthetic air charts" showing the results of tests made of out-door air and of the air in buildings equipped with different types of ventilating systems, bringing out the importance of other factors in addition to those of temperature, humidity and carbon dioxide content. He also exhibited the instruments used in the work of the Chicago Ventilation Division.

Dr. Bullock, Commissioner of Health of Kansas City, was also a guest of the chapter, and asked the aid of the engineers in some of the problems that were confronting the health officials, especially those of an engineering nature.

The election of officers resulted as follows:

President, F. A. Sheppard, Johnson Service Co.; vice-president, Vernon H. Parks, Meyer Furnace Co.; secretary, John H. Kitchen, John H. Kitchen & Co.; treasurer, W. N. McIntyre, Holtman Heating Co., Board of Governors; the officers mentioned and John G. Pease (chairman), Kewanee

Boiler Co.; R. Ward Hillman, U. S. Radiator Corporation; and Walter E. Gillham, consulting engineer.

Illinois Chapter Elects New Officers.

While the election of officers was the principal business laid out for the opening meeting of the Illinois Chapter, held October 13, at the Engineers' Club, a number of topics were brought up indicating the lines of work that lie before the chapter for the coming season. Secretary W. L. Bronaugh brought up the matter of co-ordinating the activities of the various engineering societies and urged that the Illinois Chapter participate in the movement. He stated that one result of the movement might be the establishment of a united engineering societies building in Chicago, similar to that in New York.

President Hubbard called attention to the renewed interest in the field of heating and ventilating, evidenced by the increase in the membership of the chapter. A proposal was made by Mr. Bronaugh that one of the meeting nights be reserved for Director John R. Allen of the society's Research Bureau, to keep the local members in close touch with the work being done there.

Officers were elected as follows:

President, John Howatt; vice-president, J. C. Hornung; secretary, Benjamin Nelson; treasurer, August Kehm. Board of governors: C. W. Johnson, F. W. Lamb and G. W. Hubbard.

On taking office, the new president, Mr. Howatt, endorsed the movement for co-operation among the different engineering societies and pointed out that it would be possible to do this without any of the organizations losing their identity. In connection with immediate work before the chapter he called attention to the smoke elimination campaign now being carried on in Chicago by Health Commissioner John Dill Robertson and which was receiving the direct assistance of the Ventilation Division. Extreme measures, he stated, have been taken, resulting in the closing of a number of plants violating the ordinance until proper operating conditions could be assured. He felt that plants should be closed down only as a last resort. The success of the campaign in Pittsburgh, which was undertaken about three years ago showed, he said, what could be done in this direction.

New York Chapter's Program.

Topics provided for the coming meetings of the New York Chapter include "What the Research Bureau Should Do," Walter S. Timmis, chairman; "What the Engineer Gave and Received from the War," George W. Knight, chairman; a "Visitation" meeting, A. S. Armagnac, chairman; a "Distinguished Guests" meeting, R. W. Pryor, chairman; a "Reception" meeting, B. K. Strader, chairman; and a business meeting, W. J. Olvany, chairman. The "Visitation" meeting has been scheduled for December when the chapter will visit a building containing a typical heating and ventilating installation, probably in course of erection, and will hear the details of its design and installation explained by the engineer who made the layout.

British Institution of Heating and Ventilating Engineers.

At the autumn of the British heating engineers' society, held in London, October 14, the principal business on the program was a discussion of W. W. Nobb's paper on "Air Interchanges and Consequent Heat Loss," which was presented at the summer meeting of the institute last June. It was expected that a further report would be presented of the work of the Research Committee.

Current Heating and Ventilating Literature.

Under this heading is published each month an index of the important articles on the subject of heating and ventilation that have appeared in the columns of our contemporaries. Copies of any of the journals containing the article mentioned may be obtained from THE HEATING AND VENTILATING MAGAZINE *on receipt of the stated price.*

RADIATING SURFACE.

Placing Hot Water Radiators Below Boiler Level, Wm. Hutton. Domestic Eng., vol. 88, no. 7, Aug. 16, 1919, pp. 297-299, 2 figs. Method of proportioning radiating surface to promote circulation at various levels. 20c.

SCHOOLS.

The Mechanical Equipment of Washington School, Bayonne, New Jersey, Donald G. Anderson. Am. Architect, vol. 116, no. 2278, Aug. 20, 1919, pp. 251-256, 8 figs. Heating, ventilating and electric wiring. 30c.

OIL ELIMINATION FROM CONDENSATION.

Removing Oil from Condensation, Charles L. Hubbard. Domestic Eng., vol. 88, no. 7, Aug. 16, 1919, pp. 301-303 and 332. Devices eliminating oil from condensation in steam-heating systems. Their installation and operation. 20c.

WRINKLES

Maintaining the Circulation in an Isolated Radiator.

There are so many little details and items which enter into heating and ventilation practice that but few have had experience with them all and these may have failed through lack of expression to memorize the points involved. Consideration of such items can do us no harm since there will be certain times when the knowledge of these stunts will simplify many a problem and save us considerable worry or difficulty.

For instance in some heating systems there may be a combination of poor conditions such as pipes undersized and improperly graded with pockets at some points. To increase our difficulties, the supply of steam may be limited. Now such a heating system is probably old and should be retired.

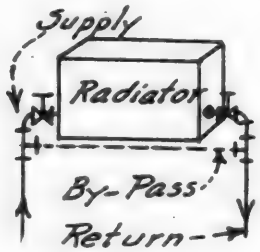


FIG. 1—MAINTAINING CIRCULATION IN AN ISOLATED RADIATOR.

It might be more properly termed "mad piping" rather than "system" since its action is far from systematic, the heating of radiator surfaces not being uniform in intensity or distribution. That is to say, irrespective of the weather or other conditions, one day certain radiators heat and some do not, while on another day their heating or non-heating is reversed. This is because there is not enough steam to go around, at least not enough to go where it has difficulty to go. It will take the line of least resistance, avoiding the pocketed, undersized and lengthy runs and will be considerably affected by the variable and scattered load due to turning heat on or off of this or that radiator.

Apropos of the above, Fig. 1 shows a method of piping to an isolated radiator at the end of a long vertical supply riser. If the supply valve at the radiator is kept open, the radiator will heat, but once this is closed the steam will not return, as the initial condensation in the ¾ in. riser is considerable when the riser is cold. This then drains back against the flow of steam. As shown in dotted lines, a by-pass consisting of a pipe connecting the supply and return of the radiator will maintain the circulation and thereby overcome the defect caused by some occupant of the room closing the supply valve. Of course the real remedy, though more costly, is to increase the size of the riser to take care of this downward flow of condensation.

Effect of Pocket in an Overhead Supply Main.

If an overhead supply main is not properly supported, a pocket may be produced at a branch connection to a radiator which from some force has settled with its supports. This condition may also be brought about by reconnecting the radiator with a new supply pipe of too short a length, thus either pulling the supply main down or the return main up. Ordinarily the supply pipe would drain itself through the branch connection but with the radiator valve closed it would soon fill up and pocket the steam at the low point. In this way the second radiator

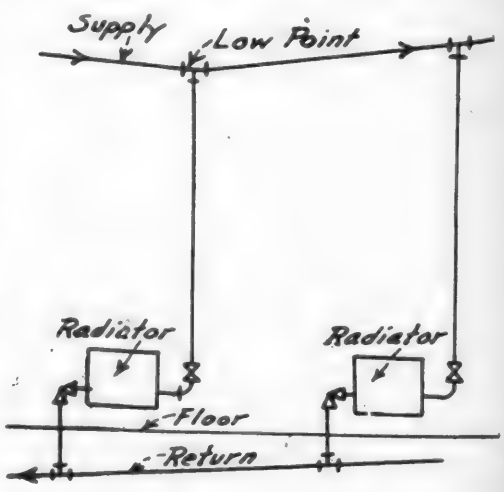


FIG. 1—EFFECT OF POCKET IN OVERHEAD SUPPLY MAIN.

would not heat whenever the first was closed off. In practice, as we know, pipes are more or less hidden and their direction must be studied out, their location and interrelation not being as clear as shown by sketch.

Problems in Running Vacuum Heating Return Piping.

In the design of a vacuum system of heating, there are problems frequently encountered in the running of the return pipe which may be overcome as shown in the accompanying illustrations. The pipe may meet with various obstructions which it must get over, around or under, such as underground water mains, a beam or doorway. The vacuum pump removes condensation and air from the

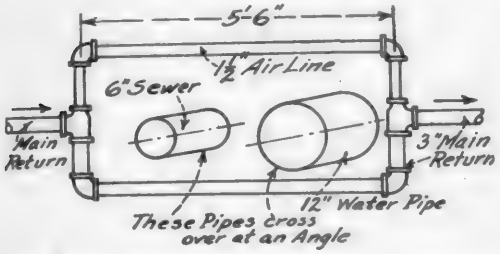


FIG. 1—POCKET IN UNDERGROUND RETURN MAIN NEAR VACUUM PUMP.

heating system so that these pockets would water-seal the air in the return pipe were it not for the upper pipe which vents or passes the air and the lower pipe which passes the water.

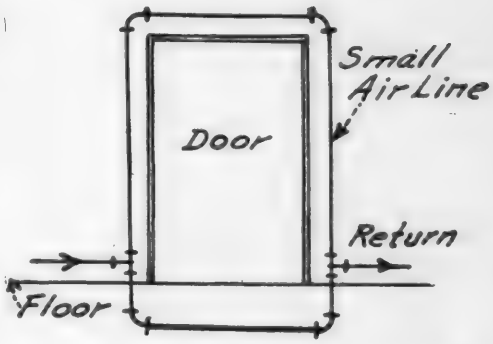


FIG. 2—METHOD OF LIFTING RETURN AT DOORWAY.

are necessary in a vacuum return system when it is desired to lift the water of condensation from a lower to a higher level. It is obvious that without the use of such fittings, water would not flow through the return which is at a higher level until the lower return had been flooded up to the highest point of its inside diameter. The water would then be lifted and carried back to the vacuum pump in large quantities, until the long horizontal return main had been completely emptied. This would produce an unsteady load on the vacuum pump.

A lift pocket merely insures the lifting of the returns because of the always present well of water. The water is lifted from this well as fast as it is received. The top of the well is level with the bottom of the return main, because of the vertical lift pipe extending to that point. Lift pockets are not an

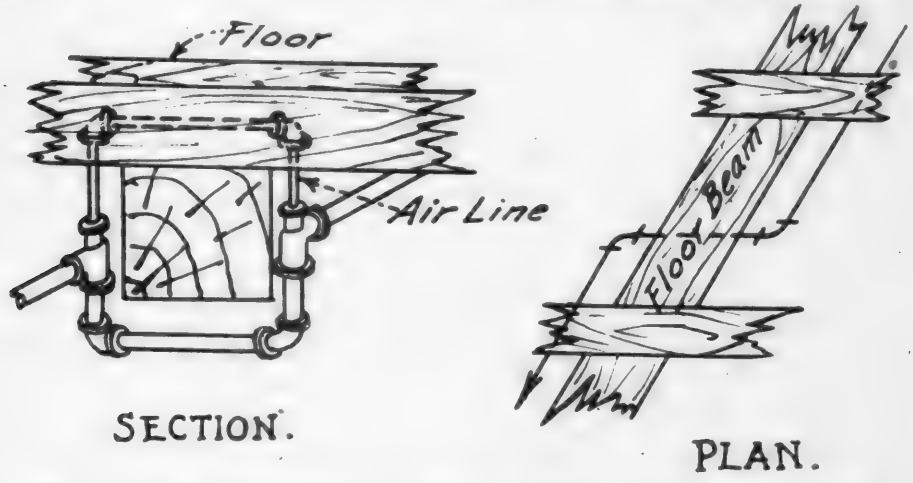


FIG. 3—ANOTHER METHOD OF LIFTING RETURN OVER OBSTRUCTION.

In Fig. 4 the air or vent line is omitted, the purpose being accomplished by means of a lift fitting as detailed in Fig. 5. Lift pockets

experiment, but have been tried out in practice in many installations; and have been used with success, even on 16-ft lifts. Gen-

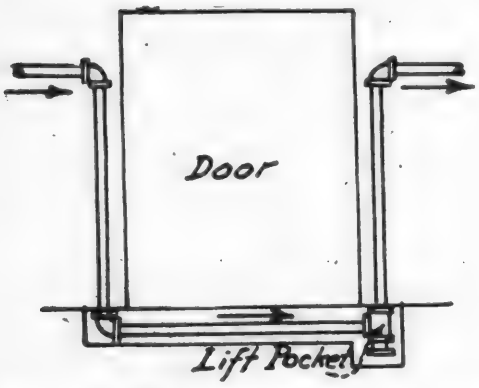


FIG. 4—METHOD OF LIFTING RETURN, WITH LIFT POCKET.

erally speaking, the necessity for a high lift is rather a remote contingency; which may usually be avoided in a system properly designed.

In making a lifting device by using pipe fittings, extreme care must be used in inserting the lift pipe, there being no way of insuring the position of this pipe, with respect to the lower horizontal return. The probabilities are that the vertical pipe will be extended too far into the tee by the steamfitter, and that it will, therefore, refuse to operate properly, if at all. Another point is that the run of the tee should be two sizes larger than the horizontal return.

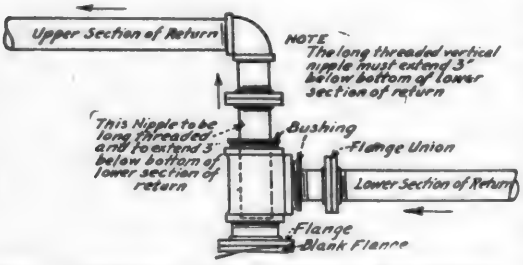

Upper Section of Return
NOTE
The long threaded vertical nipple must extend 3" below bottom of lower section of return
This Nipple to be long threaded and to extend 3" below bottom of lower section of return
Bushing
Flange Union
Lower Section of Return
Flange
Blank Flange

FIG. 5—SUCTION LIFT FITTING FOR LIFTING RETURNS.

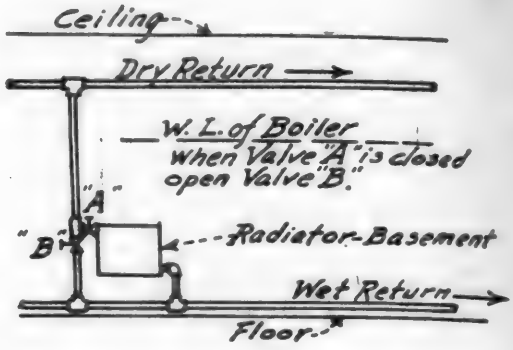


FIG. 6—RADIATOR CONNECTION BELOW WATER LINE, RADIATOR BEING HEATED BY RETURNING CONDENSATION.

The vacuum system is not alone in its problems as instanced by the condition shown in Fig. 6 wherein the wall radiator is on the same level as the boiler, the radiator being heated by returning condensation. The method of heating is by steam with gravity return, but in the present case the radiator must be of the water type.

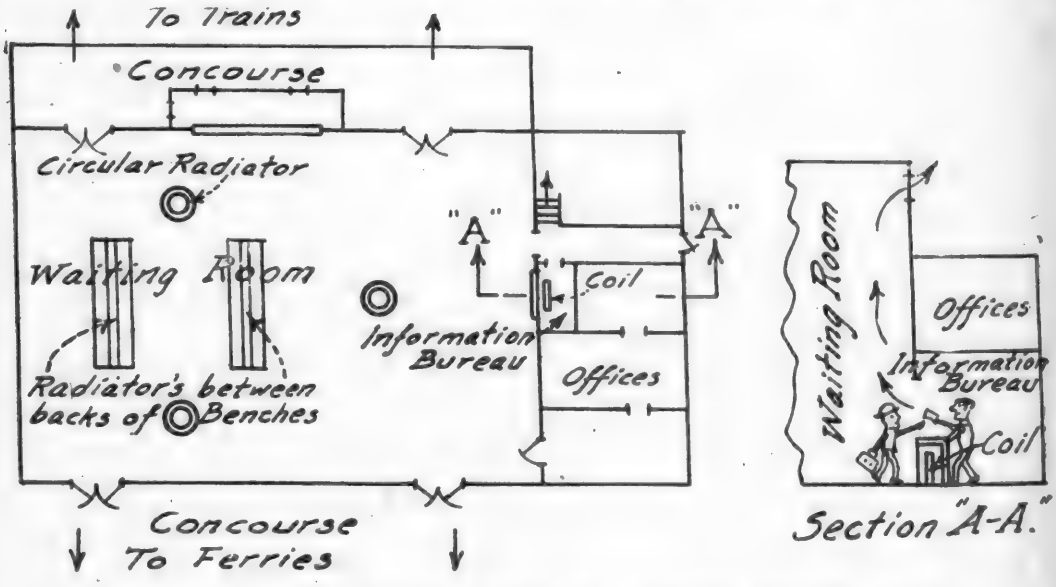


FIG. 1—HEATING AN INTERIOR ROOM OF A RAILROAD WAITING ROOM.

Factors Involved in the Heating of Waiting Rooms.

Doubtless, we are all familiar with the proper location of radiators next to the exposed walls or other exposures. It is, however, with the local heating of some interior room that we may have less knowledge. Take as an instance, an information bureau adjacent to the large waiting room of a railroad station. A waiting room of this type is a case of interior heating for various reasons. At train time in particular, with incoming suburban trains, there will be a flushing out of the station and the temperature will be lowered ten degrees. Passengers are more or less nervous, they want to be on their way, so prefer not to sit but rather to stand and warm up at radiators, particularly in extreme weather. Now these passengers and also the radiators must be well back, away from the doors and the traffic. If, however, the station is a modern one it may be easily designed for heating along exposed walls. For those that use the benches, there must be radiation located between the backs of these seats.

The description of the heating for the waiting room is given since in this particular case it affects the heating of the information bureau. The latter has a low ceiling, the waiting room an extremely high one, with windows at the top serving as outlets for the heated air. The air near the top of such a room may be ten degrees warmer than at the breathing level. This means that there is a tendency for the hot air from the pipe coil to travel directly out of the small room without heating it. For such a condition it is best to place the coil at the rear so that the heat, and not the cold air, will pass over the occupant. A better way would be to divide the heating surface up into two coils, one at the front and one at the rear.

False Water-Line Trap.

A water-seal trap, as shown in the accompanying sketch, is often used for the purpose of fixing the water level in a heating system. Frequently it is desired to maintain this water level in the return system at a certain point in order to make the return piping what is known as wet. A wet return, being placed below the water-line of the boiler, carries water only, and thus may be smaller in size than a dry return. The latter usually contains a certain percentage of steam with the water, additional space being allowed for the steam by the selection of a larger sized pipe.

Referring to the accompanying sketch, "A" is a pipe of length varying from 2 to 6 ft., as determined on the job. It connects to the main return for the admission of water to the trap. When the water-line in the system has reached the desired point for which the trap has been adjusted, the float opens the balanced valve by means of a connecting lever. This allows the excess condensation to flow back to the boiler, the valve then closing as soon as the water level has lowered to the fixed point. A 1¼-in. pipe connection is made from the top of the trap to the low-pressure steam main. This equalizes the pressure in the return at the boiler and trap. A valved water-gauge glass is fitted to the trap to show the existing water-line.

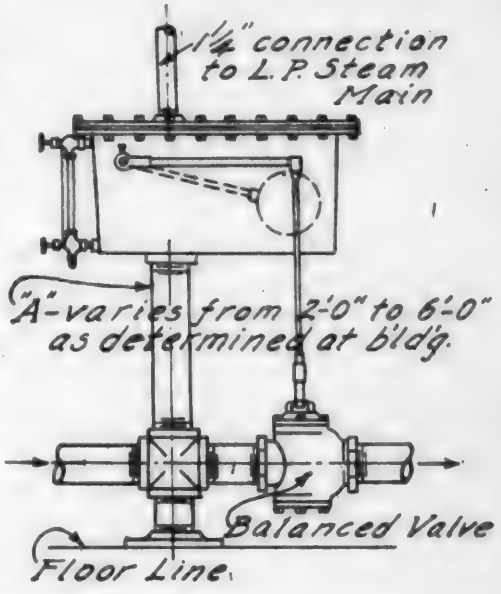


FIG. 1—TRAP FOR MAINTAINING A WATER SEAL OR FALSE WATER LINE.

Proper Methods of Making Run-Out Connections.

Run-outs from mains or risers to radiators do not always receive the attention they deserve. Those to first-floor radiators should be connected direct to basement mains. An exception to this is in

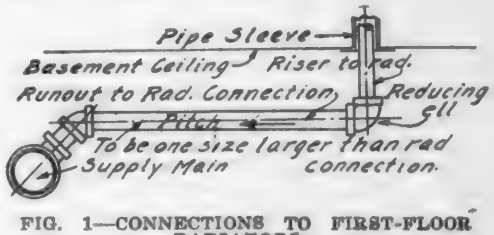


FIG. 1—CONNECTIONS TO FIRST-FLOOR RADIATORS.

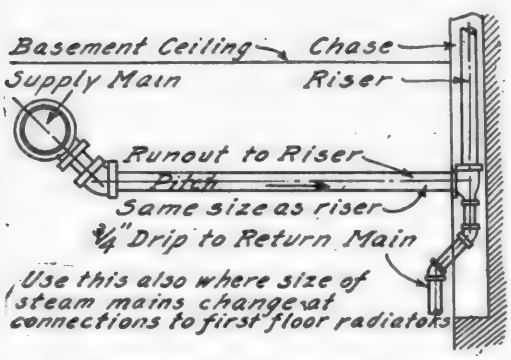


FIG. 2—RUNOUTS TO RISERS SHOWING METHOD OF DRIPPING MAIN AND RISER.

the case of overhead distributing mains where the runouts are naturally connected to the risers. The standard method of connecting a first-floor radiator is shown in Fig. 1, while the method of connecting the riser to the supply main is shown in Fig. 2. The latter is done so as to drip the main, as well as the riser, This method of drip connection is desirable only in small systems where the riser is not valved.

Run-out branches 5 ft. or more in length, from main to riser, should be made one size larger than the riser. Those over 5 ft. (or where the pitch is slight) from main to first-floor radiators, should be made one size larger than radiator connection, the reduction to size of radiator connection being made just below the radiator valve.

Runouts in steam heating systems should never be less than 1 in. in size for the two-pipe system, or 1¼ in. for the one-pipe system. Sizes for return connections from radiators should not be less than ¾-in. Return mains less than 1 in. should not be used; in fact, piping should never be under ¾-in. because of its liability to mechanical injury, inside corrosion and stoppage.

In water heating systems, runouts are taken from the top of the risers. Where the riser is extended to the floor above, connection is made to the side outlet of a tee, as in Fig. 3. The effect of the higher column of hot water is to short-circuit the lower-floor radiators, causing a greater flow to the upper floors. The latter method of connection is made to offset this by giving a certain amount of preference to the lower-floor radiators. Where two adjacent radiators are connected from the top of a riser, as in Fig. 4, the one with the greater amount of heating surface should have the preferential connection, the other being connected from the side outlet of a tee.

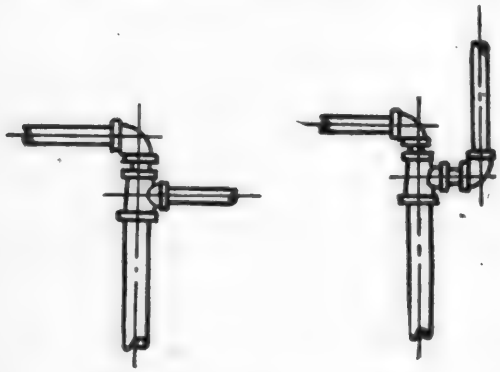


Fig. 4 Fig. 3.

HOT WATER RADIATOR CONNECTIONS

Contractors' Service Corporation.

An interesting plan has been adopted by the Associated General Contractors of America in forming the Contractors' Service Corporation for the purpose of providing its members with the best possible bonding and insurance service. The corporation will act as agent or broker for the members in placing their liability and compensation insurance and surety bonds. Eventually, it is stated, the corporation will place all forms of insurance and bonds. The main office of the corporation is at 11 Pine Street, New York.

This is in line with the recommendation made by John Trainor at the last convention of the National Association of Master Plumbers urging that association to form such a corporation for the benefit of its members.

For National Association of Building Trades Employers.

The organization meeting of a new organization, to be styled the National Association of Building Trades Employers, was held in Chicago September 23-24. It was announced as the first nation-wide gathering of building contractors.

It is proposed to unite into one national body for mutual protection and benefit, associations of all the building trades employers' associations, with the idea of preventing jurisdictional and sympathetic strikes, to foster uniformity, harmony and certainty in the relations of employers and employees and "to oppose any unlawful and unwarranted interference with the right of con-

tractors in the pursuit of their calling."

Those active in the new organization are W. F. Hennessy, secretary of the Cleveland Building Trades Employers' Association, E. M. Craig, secretary of the Chicago Building Construction Employers' Association; and C. C. Pierson, secretary of the Indianapolis Builders' Exchange.

MODERN PRACTICE IN VAPOR HEATING

EDITOR'S NOTE: *For the purpose of this series of articles, a vapor, vacuum, vapor-vacuum, vacuum-vapor, atmospheric, modulated or thermograde system of heating will be considered as any system in which the steam pressure ordinarily carried is practically at atmosphere or slightly below or in which the returns are open to the atmosphere and where no pump or other positive mechanical device is employed to pull back the returns.*

XVI—THE EDDY SYSTEM.

The Eddy equipment is designed to vent low-pressure steam heating plants in the ordinary firing of the boiler, creating and maintaining a vacuum in steam boiler, radiators and mains.

Its most characteristic feature is the use of a retarder on the outlet of each radiator in place of the usual thermostatic or similar trap to permit the escape of air. These retarders are also used on the steam mains at certain distances and serve to permit air to escape from boiler, radiators and mains to the air pipe, but to retard the escape of steam and to prevent the return of air to the system.

Ordinary radiator valves are used for the supply ends of the radiators. In addition to the steam piping, there is a main air pipe with risers and branches to radiators on all floors. Near the boiler is located a combination receiver, with an exhausting and vacuum valve which receives and vents the air from the extreme end of the main air pipe. Below the re-

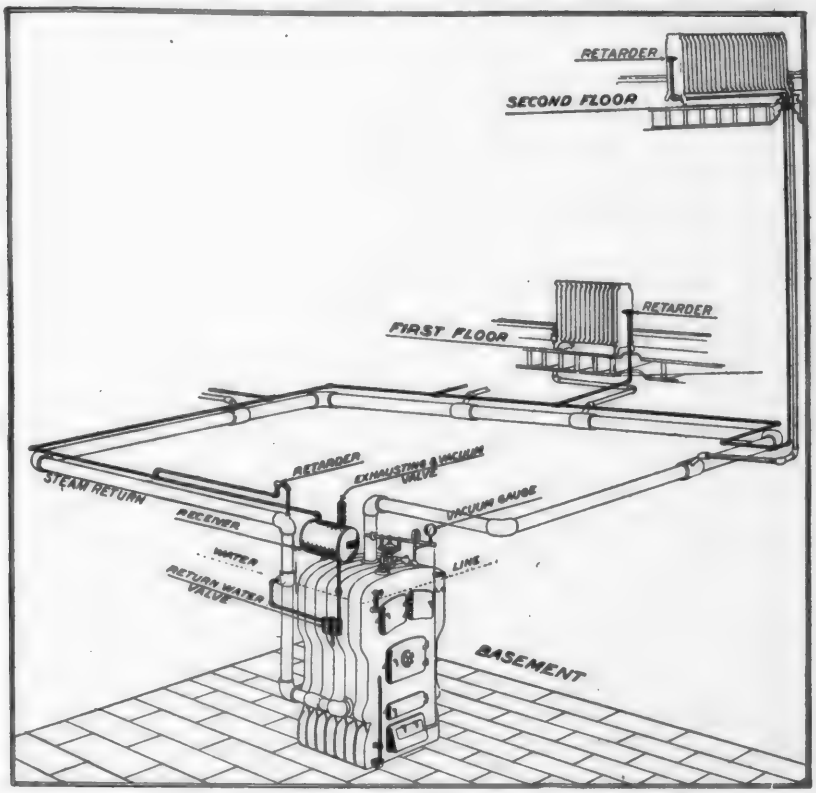


FIG. 1—TYPICAL LAYOUT OF EDDY SYSTEM.

ceiver is located a return water valve which receives in its trap any condensation water that may be in the main air trap, transmitting such condensation to the return end of the steam main above the water line in the boiler. A vacuum gauge and a few other minor accessories complete the equipment.

The retarder itself deserves a special description. It is made of brass and tin and in funnel-shaped inside, with a minute opening at the inlet end. There are no movable parts. The male end of the retarder is connected to the radiator or steam main, while the outlet or ground union is connected to the branch air pipe. One retarder is placed on each radiator, irrespective of the radiation provided for,

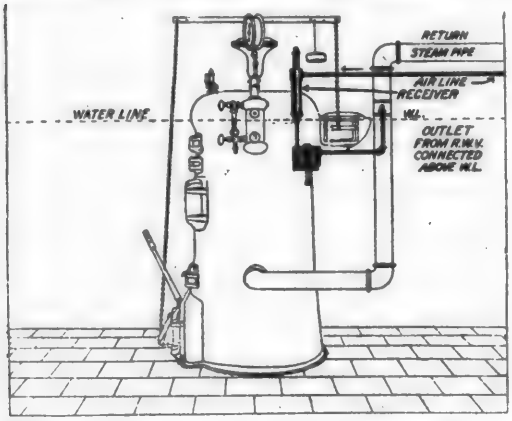


FIG. 2—DETAIL OF AIR PIPING AND BOILER CONNECTIONS, EDDY SYSTEM.

and also on the steam mains. Care should be taken, however, that no retarder is placed so that there will be less than 10 ft. of pipe between it and the receiver. All retarders, also, should be located throughout the system above the main air pipe, and all branches from retarders must drip down to the main air pipe. Therefore, when venting indirect, wall or ceiling radiators located below the main air pipe, a branch pipe must be extended from the bottom of the radiator to a point above the main air pipe where the retarder will be connected by another downward pipe to the main air pipe. In this manner the return end of the steam main must be vented, as shown in Fig. 2.

The receiver, with its exhausting and vacuum valve, should be placed so that the bottom of the receiver will be above the water-line in the boiler and the valve in a strictly vertical position on top of the receiver. The receiver takes all air and condensation water from the main air pipe, the air being exhausted out of the system by the exhaust and vacuum valve, and the condensation water, if any, passing down to the return water valve. No air can return through this valve.

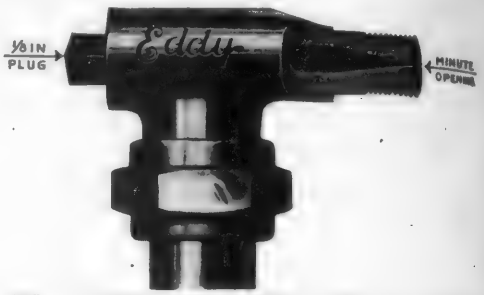


FIG. 3—EDDY RETARDER USED IN PLACE OF RADIATOR RETURN VALVE.

In connecting the return water valve it will be noticed by referring to the drawing that this valve is placed some distance below the receiver. This is done so that it will be always "trapped," that is, full of water. The outlet to the boiler must be connected above the boiler water-line so that a siphon-like effect may be obtained automatically. This connection can be made, if desired, to the return end of the steam main, as shown in Fig. 2, or the valve can be connected to a T in an equalizing pipe from an opeing on top of the boiler to one below the water-line. Its function is to permit the water of condensation to pass freely from the receiver to the boiler, at the same time preventing the passage of steam or water in the opposite direction.

The accompanying diagram (Fig. 1) shows how the main air piping and connections should be installed. The piping must drain towards the receiver in all cases to insure free venting. For the main air pipe, the sizes recommended are: ½-in. up to 50 retarders, and ¾-in. if there be more than 50 retarders. All branches should be at least ⅜-in., to be reduced to ¼-in. for connecting retarder. Reducing

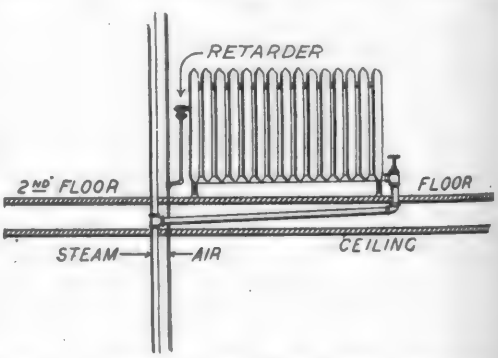


FIG. 4—DETAIL OF RADIATOR CONNECTIONS, EDDY SYSTEM.

tees, elbows and couplings are suggested instead of bushings for reducing.

A point for discussion that will immediately occur to the observing reader is the minute opening in the Eddy retarder, rendering it liable to clog. The manufacturers esphasize the suggestion that this opening should never be enlarged. If it should happen to clog, the interior shape directs a cleaning wire to the minute opening, access being had to the interior of the retarder through the ⅛-in. plug at the opposite end.

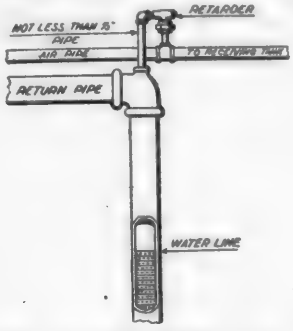


FIG. 5—USE OF RETARDER FOR VENTING STEAM MAINS.

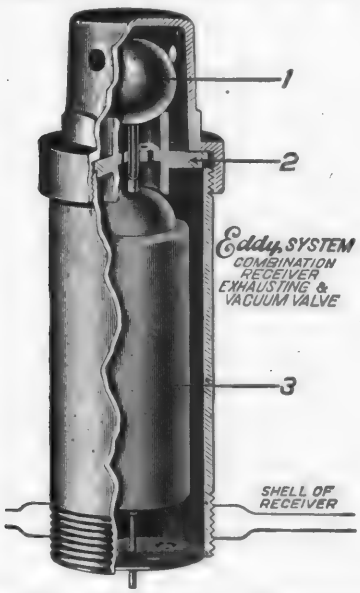


FIG. 6—EDDY RECEIVER, EXHAUSTING AND VACUUM VALVE.

As with any vapor heating system, the piping should be clean to begin with. In new installations this may be accomplished by continuing steam pressure long enough to locate leaks, if any, in air connections to radiators, etc. In this system, it is also suggested that while making steam for testing and blowing off boiler, it is advisable to unscrew the cap on the sediment nipple at the bottom of the return water valve and continue the steam pressure until condensation drips from this valve. This should be allowed to continue for some time, as it removes oil, etc., from the air piping. The same rule applies when connecting the Eddy system to an old installation; the idea being to prevent any oil from coming into contact with the rubber ball in the return water valve.

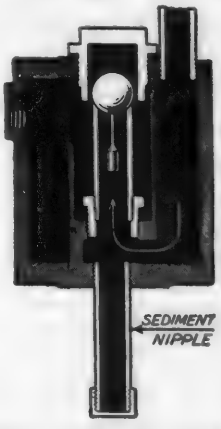


FIG. 7—EDDY RETURN WATER VALVE.

The manufacturer of the Eddy system is the Eddy Engineering Co., Alpena, Mich.

New Publications.

THE ORIFICE AS A MEANS OF MEASURING FLOW OF WATER THROUGH A PIPE is the title of a new bulletin (No. 109) just issued by the Engineering Experiment Station of the University of Illinois, Urbana, Ill. It is stated that the selection of the type of meter to be used in measuring the flow of water through a pipe line should be based upon the consideration of the difficulties of installation, permanency of operation, accuracy of measurement, and the cost of installation and maintenance. Tests to determine the practicability of employing thin-plate orifices in pipe lines, and the conditions most favorable for their use as measuring devices, have been completed by the Engineering Experiment Station of the University of Illinois under the direction of R. E. Davis, associate in civil engineering, and H. H. Jordan, assistant professor in general engineering.

The tests reported in the bulletin were conducted with three sets of orifices of eight different diameters per set cut in 3/16-in. steel plates. Data were obtained from 4-in, 6-in, and 12-in. pipe systems respectively.

The Trade Extension Bureau

Headquarters: Evansville, Ind.

Bulletins on "Business Efficiency Course."

Rapid progress on the "Business Efficiency Course" is reported by the National Trade Extension Bureau. Those desiring to receive copies of the bureau's literature should make sure that their names are on the bureau's mailing list.

The first manual of the "Business Efficiency Course" covers the subject of "Fixed Charge" or "Overhead" which was reviewed in last month's issue.

A new pamphlet on "Estimating" constitutes the second bulletin in the course.

When the questionnaire survey of the heating and plumbing industry was made last July, the two sore spots in the business efficiency of the contractors were found to be the weakness in figuring costs and in estimating. Both of these link so closely together that weakness in one means failure in the other, so that even the vital missionary work of the standardized accounting system was set aside and the "Fixed Charge in Estimating" bulletins were given preference.

In its forthcoming bulletin on "Estimating" the bureau has gone a step farther than in its earlier work. The new estimating bulletin is amply illustrated with reproductions of actual contracts figured upon. The plans are taken off and the notations made by an estimator are carried out in detail. Quantity estimate sheet, estimate sheet records, plan records, contract forms, request for quotations, together with the jobbers' quotation, envelope and folder files are also illustrated.

A short cut in estimating labor is offered on page 12 of the bulletin. From statistics gathered by means of voluntary information, given by a number of contractors, regarding the amount of labor a workman can do, an estimating formula has been arranged. Labor on roughing in, hot and cold water pipe fitting, pipe covering and setting of fixtures on various weights and all estimated on the formula sheet. Actual tests were taken to ascertain the number of cubic yards of dirt which can be excavated at certain depths, and are included in the formula.

Printed estimate sheets such as those used in illustrating the booklet will be supplied to the heating and plumbing contractors at even less than quantity cost price. Thus the small contractor who wishes to purchase only 100 estimate sheets, or 100 heating and plumbing contracts, can do so and at approximately the same price which he would have to pay were he to order them in 50,000 or 100,000 lots. For example 100 printed estimate cost sheets are quoted at 50 cents. Envelope estimate files at 35 cents per 100. The prices quoted by the Trade Extension Bureau, however, are based on the present stock on hand and subject to change when new lots are printed. All prices include postage.

This is one of the phases of real service which the Trade Extension Bureau offers the heating and plumbing contractor of the United States. It links with a reduction in overhead and, by giving the contractor the benefit of the economy of cooperative and quantity purchases, produces real authentic estimate sheets.

New Directory of Heating and Plumbing Contractors.

The Trade Extension Bureau is completing, from authentic sources, a classified directory of heating and plumbing contractors in the United States, to be published in pocket size. The names will be properly classified, showing whether the firms listed are engaged in heating or plumbing, or both. In the same directory will be published a complete list of the jobbing and manufacturing firms which are financing the bureau.

Prepare for the Future.

Every now and then we hear the question asked, "Why all this effect of trade extension when the present demand exceeds the production?" Such is literally true, states the bureau, at this time, but this condition cannot and will not last. The present state of affairs, it is explained, is but one of the results of the war. Many of our manufacturers turned their plants over to the government for shell making and other purposes necessary to win the war and were held by the government until June of the present year. Since that time the owners have been putting forth every effort to place their plants back upon a productive basis.

It will require several months more for these plants to reach the same efficiency in production that existed prior to the war. Many of the former workmen have been employed in other lines. The few remaining had in a measure lost their skill. Others refused to work night shifts and so on. The conditions, the bureau reports, are gradually righting themselves. By January 1 the production of high-grade appliances will be greater than at any period since 1914. Trade Extension will necessarily be needed to move this vast production of wares in the absence of normal building conditions.

THE RECONSTRUCTION ERA

Canadian Industrial Conference.

At the Canadian Industrial Conference which was held in Ottawa September 15-20 it was found impossible for the representative employers and labor men to agree upon a problem for collective bargaining. This had been defined by the Royal Commission on Industrial Relations as "a term which implies the right of workers to group themselves together for the purpose of selling their labor power collectively to their employer instead of making individual agreements." The Royal Commission, which favored such an arrangement, maintained that such collective bargaining does not mean recognition of the closed shop unless the agreement so provides.

EMPLOYERS' RECOMMENDATIONS.

As the representatives of the employers and employees in the Conference could not agree on this subject the Conference received separate recommendations from each group. Those of the employers were that:

(a) Employers admit the right of employees to join any lawful organization.

(b) Employers should not be required to recognize unions or to establish "closed shops." Employers insist on the right, when so desired, to maintain their plants as "open shops," by which they mean that no employer should discriminate against any employee because of the latter's membership or non-membership in any organization, and no employee should interfere with any other employee because of the latter's membership or non-membership in any organization.

(c) Employers should not be required to negotiate, except directly, with their own employees or groups of their own employees.

RECOMMENDATIONS OF EMPLOYEES' REPRESENTATIVES.

The recommendations of the employees' representatives were that:

1. With a view to effecting and maintaining harmonious relations between employers and employees, this conference declares the following principles and policies, and urges their adoption by all employers relative to their respective employees:

(a) the right of employees to organize;

(b) the recognition of labor unions;

(c) the right of employees to collective bargaining.

2. In these recommendations, without changing the generality of their terms—

(a) "the right of employees to organize" means the right of employees to organize or form themselves into associations for lawful purposes.

(b) "the recognition of labor unions" means the right of employees, or their duly accredited representative or representatives, to recognition of their employer or employers, for the purpose of mutually arranging rules and regulations governing wages and working conditions.

(c) "the right of employees to collective bargaining" means the negotiations of agreements between employers or groups of employers and employees or groups of employees, through the representative or representatives chosen by the respective parties themselves.

Entering into agreements and bargaining collectively with an association or union of employees does not mean recognition of the "closed shop," unless the agreement so provides.

(d) "employer" or "employers," as used in clauses 1 and 2, means any employer or employers of any industry and of Federal, Provincial and Municipal Governments.

3. That the Federal and Provincial Governments be urged to enact legislation applicable to industries within their respective jurisdictions, to make it unlawful for any employer who shall discharge or refuse to employ or in any manner discriminate against employees merely by reason of membership in labor unions or for legitimate

labor union activities outside of working hours.

On the question of hours of labor the conference recommended the appointment of government commissions to investigate the adaptability of the hours of labor principles of the Peace Treaty to the different industries of the country. A legal eight-hour day was recommended except in certain industries subject to seasonal and climatic conditions.

In connection with joint industrial councils it was recommended that the government establish a bureau of the Dominion's Department of Labor to gather data and furnish information whenever requested by employers and employees, with a view of giving the fullest assistance when it is desired to establish such councils.

The housing problem in Canada was acted upon by the Conference, its recommendation being that increased co-operation of, and investigation by, the Dominion and Provincial governments be undertaken to find a solution of the problem. On this subject the Royal Commission had reported that "a cause of unrest met with practically everywhere is the scarcity of houses, and the poor quality of those which do exist. Unsanitary conditions and insufficient rooms are the chief complaints. In nothing has production more signally fallen off during the war than in the building of dwelling houses, and the prevailing high prices make it practically impossible for the worker to provide himself with a home. Some means should be adopted with as little delay as possible to remedy this defect."

National Budget Plan.

"It seems axiomatic that no sound financial policy of government can be hoped for under a system which appropriates money to be spent, without consideration of how much money there will be spent, or which levies taxes and provides for revenue without due consideration of how much revenue must be raised. Similarly, a system of legislation which practically prohibits Congress from having any clear idea at all of the next year's program of governmental activities as a whole, and even of the plans and appropriations of any single department, can only lead to confusion, carelessness and waste. Such, however, are the conditions under which Congress labors."

That is the concensus of opinion of the business men of the country as expressed to the select budget committee of the House of Representatives through the Chamber of Commerce of the United States, by W. L. Clause of Pittsburgh, chairman of the National Chambers' committee on budget and efficiency.

Should Prices Be Standardized?

Thus far in the economic history of America the scale of prices has been as temporary and uncertain as the indications of the mercury in a thermometer. Prices have gone up and down for all kinds of reasons, and indeed they have often seemed to do so without any apparent reason. An increasing number of people feel that this is not as it should be. It is not easy to formulate an unfailing remedy, of course. Neither is it possible to say whether price fixing would prove a success or a failure. It does look reasonably sure, however that prices should be stabilized in some just and proper manner.

There are always those who are ready to tell us that it is not necessary to attempt to do anything about the price situation. They say that the scale of prices will automatically take care of itself according to the operation of the law of supply and demand. This sort of a situation might do very well if only it existed in some other world than that of fancy. There probably was a time in the earlier periods of the history of the market-place when the law of supply and demand governed all prices. That time, however, seems to have passed.

LAWS OF SUPPLY AND DEMAND NO LONGER APPLY.

Tradesmen have learned methods by which they can so successfully juggle the situation as to supply and demand as to entirely reverse the action of the time-honored law so often invoked in defense of the profiteer. The cold storage method of preserving eggs, for instance, has been used to make them cost most during that season of the year when they are most plentiful, and to be cheapest during that portion of the year when the greatest number of hens are on a vacation.

As a matter of fact, the law of supply and demand is not the rightful governor of prices. It does not take into account the one thing which should be the deciding factor in the cost of an article, namely the cost of production. It requires as much labor and as great an investment to produce a bushel of cheap wheat as it does to produce the same amount of wheat at a good

figure. The cost of a bushel of wheat should always be the cost of production plus a fair rate of profit to the producer. The producer would then be sure of his profit, and the consumer would know how to estimate his expense.

A fluctuating price scale does not make for certainty in financial transactions and stability in commercial organization. Except in the most general way no one is able to say today what things will cost or bring tomorrow. In considerable part this condition has been brought about by the deals of speculators who make their living by the rise and fall of the markets, and often by forcing prices up and down by arbitrary methods.

ALL DEALING REDUCED TO A PROCESS OF GAMBLING.

In other words, an uncertain system of prices not only makes it possible for a group of men to gamble upon them, but it does much to reduce all dealing to a process of gambling. Even if all other conditions are favorable. The producer does not know whether he is to gain or lose. Neither does the consumer know whether he is to be able to obtain things at a fair price.

Such a condition is unsatisfactory to both. For each advantage or disadvantage are alike possible, and they usually alternate. The advantage of one, moreover, must generally be brought about by the disadvantage of the other. Such is not a necessary state of affairs. One does not need to lose either in his buying or selling. Neither should his gain be abnormal. The establishment of prices upon a fair and permanent basis could make it possible for a transaction to be always to the mutual advantage of the seller and the purchaser. In other words, it would lift the markets above the gambling level.

There is another way in which an uncertain system of prices works a great injustice in the economic system. They offer no real incentive to industry, ability, and preparation. We have done and heard a great deal of preaching to the point that these things pay because the man who prepares best and works hardest will be best rewarded.

As things are now the worse trouble with this claim is its falseness. A man may work ever so hard in almost any process of production, and have his reward shrunken out of all proportion to his toil by some sudden slump in prices for which he was in no way responsible. On the other hand he may neglect ever so important a task, and at the last moment be favored with a rise in prices which will turn things to his profit.

On the one hand he always stands a chance of failing to receive what rightfully should be his, a situation which does not represent good business. On the other hand he also stands a chance of receiving what he does not earn, a situation which does not represent good business either. It should be possible by means of having a stable price scale to make it practically sure that every person concerned in the process of production would receive his due. Naturally the highest reward would come to the man of greatest earning power. The result would be the placing of a premium upon industry and efficiency. Until we do so we shall have no oversupply of either.

UNCERTAINTY OF PRICES PRODUCES SPIRIT OF UNREST.

Uncertainty of prices has one serious social tendency. It produces a certain spirit of unrest on the part of the consumer. It may be true that the average person overdraws some of his conclusions on this question. It may be, too, that he bases some of them upon insufficient reasons. At the same time, however, his attitude is a fact which must be met and reckoned with.

He is not unreasonable. On the contrary, he is quite reasonable. He wants the other party, as well as himself, to have all that is his due. He has no objections to meeting the real cost of an article. He has some notions, however, as to what that cost should be. If prices go up, he expects them to have some proper reason for doing so. He works for his living, and he expects others to do the same. When he cannot count on what a day may bring forth, he cannot plan his financial future, for he has no idea one season what it is going to cost him to live the next. He has a feeling that it is time to get prices adjusted as they should be in fairness to all concerned, and then keep them so.

One of the worst difficulties with our fluctuating system of prices is the fact that it does not made adequate provision for the economic life of the country. Our commercial system has the same function in the service of society that the blood has in maintaining the life of the body. Its work is to carry supplies, promptly, effectively, and regularly to all the points where they are needed.

The body is not in good health when the blood overfeeds it part of the time and starves it the rest of the time. It is not proper, either, to have congestion at one point and anaemia at another. The func-

tion of circulation must go on with uninterrupted constancy.

The world needs a practically fixed amount of food, clothing and supplies for the maintenance of its life and activity. It has also a practically fixed amount of wealth to keep them moving. Unsteady prices are always changing the value of a dollar and making the necessities of life easier or harder to get. The world cannot therefore supply its wants with the same ease and in the same abundance at any two successive times. The value of supplies and the value of money should both be constant. The world could then meet its needs at every point. No worker would lose his reward; commodities would be certain to yield their worth; and no one would be any the poorer for the change.—*Clarence E. Flynn in The Dodge Idea.*

Payment for Estimating.

Arguments favoring payment for estimating have been advanced for years at meetings of heating engineers and contractors. Recently the Associated General Contractors of America has taken up the matter and has secured two statements from men deeply interested in the subject—one in favor of payment for estimating by H. W. Nelson, president of Moline Heat, and author of "The Nelson Form for Choosing Bidders and Awarding Contracts;" and one in opposition to the plan by William Graves Smith, president of the Quantity Survey Company.

The most interesting point in Mr. Nelson's plan is the basis upon which payment for estimating is to be made. This, briefly, is that in the case of general building contractors they shall receive 50% of the square root of the average of all bids, excluding those exceeding by more than 25% the amount of the bid upon which the contract is awarded; in the cases of sub-contractors and other principal contractors, they shall receive 20% of the square root of the average of all bids, with the same exception. The plan was arranged so that in the case of public work the number of bidders would be governed by the size of the contract. As an example of how this would work out, an instance was given where the average of all bids received was $90,000, the square root of which is $300.00. 50% of this would be $150.00, which would be the amount paid to each competing bidder in payment for the labor and expense involved in estimating and as a complete waiver of all obligations.

THE KELLEY PLAN.

Attention is also called to the "Kelley" plan which comprises a definite schedule for charges for estimating the cost of projects valued at from $2,000 to $1,000,000. A contractor, party to the plan, submitting an estimate on the job, adds to his original estimate a sum equal to as many times the cost of estimating that job, as indicated by the schedule, as there are contractors bidding on the job. After the contract has been awarded and the job has progressed to a reasonable stage of completion, the successful contractor pays the total amount which he has added to his estimate to the local agent of the "Association." The agent divides that amount equally among the bidders, except 15%, half of which goes to the local agent and half to the "Association," which, as at present organized, is a private corporation operating for profit.

For example, if ten contractors, members of the "Association," are considered as bidding on a project approximating $75,000 to build. The average cost of estimating such a job is set, say, at $125.00. Each of the ten bidders then estimates the job in his own way and adds $1250 to his bid, or 10 x $125.00. After the contract has been awarded and the job has progressed sufficiently, the successful bidder pays $1250 to the local agent of the "Association." The agent gives each of the ten bidders $106.25, keeps $93.75 himself and pays $93.75 to the "Association."

It is claimed for this system that it encourages competition which tends to reduce ultimate building costs 10%. The weakness of the "Kelley" system, it is pointed out, is that there is a possibility of excessive bidding by irresponsible contractors. Of course, it is to the agent's advantage to increase the number of bidders and this may lead to abuses. It is important, therefore, that the co-operation of the architect and the approval of the owner should be gained in each instance. This, however, would remove the need for a middleman at a fancy commission. If recognition of the right to charge a fee for estimating is made by the architect or owner, there is no reason for including the fee in the bid. If it is not included in the bid for the contract, it will not affect the total estimate, and hence it will no longer be necessary for all or none of the contractors to agree to charge for estimating. If a fee is paid each contractor for estimating, there will be no necessity for the contractors to form a pool from which their payments may be made.

THE QUANTITY SURVEY PLAN.

In the "Quantity Survey" plan, the estimating cost is carried as part of the "overhead." This is based on the argument that the building owner eventually pays for all expenses. The overhead expense of architects and contractors which covers miscellaneous expense of all sorts on projects that do not eventuate in contracts for them is collected on the jobs for which they do receive contracts. Building owners, it is held, therefore pay indirectly for all estimating and quantity expense.

Again, a sharp distinction is drawn between estimating expense and quantity expense, estimating expense being defined as that involved in determining labor and material prices and everything else that enters into pricing up quantities of work to be done, and quantity expense as that connected with the preparation of quantities.

In this connection it is pointed out that there is a sad misconception or disregard of "overhead" on the part of many contractors. Some say, for example, that estimating expense comes out of "profit."

There must be competition, it is claimed by the advocates of the "Quantity System." Anything permitting or leading to the development of a building trust will be disastrous to the interests of the majority. On "cost plus" work even there should be a competition for a "percentage contract" among acceptable builders to demonstrate their ability to give service. Service can only be measured ultimately in terms of cost. On the other hand, competition can only exist when uniform requirements are made the basis of competition. Anything else is speculation. Constructive ability and management should be the winning and determining factor. Until they are and until a generally accepted minimum percentage of profit is demanded by all, the contractors' existence will continue to be a stormy one.

Anything that decreases a contractor's "overhead" or allows him to figure "costs" more accurately, or gives him a better opportunity to demonstrate his superior constructive and executive ability, without increasing cost to the building owner, is a good thing for both parties. Direct payment for estimating, it is argued, would not reduce a contractor's expense for same. His overhead would not be reduced, for a contractor would not be furnished anything that would reduce his labor or lessen his responsibility. It would simply change the method of re-imbursement and shift the burden of expense. Contractors that properly treat "overhead" as something separate from "profit" know that they collect in "overhead" all of their estimating expense from the jobs they win.

The trouble with the present situation, it is claimed, is that in contracting, bidders have been doing both the quantity work and the pricing or estimating work.

In conclusion, it is brought out by advocates of the "Quantity System" method that contractors cannot, under prevailing methods, give a price for a building or for an installation of equipment as simply as a dealer can, say, for coal. He must find out what is going into the building or what constitutes the equipment. That involves the matter of quantity expense and the risks carried therewith. An analysis of that part of the contractor's work will develop the real reason for the demand and the agitation for relief and will dispel some of the confusion that exists.

Many contractors, it is known, are opposed to the "Quantity System" for the reason that its universal and complete use would place the sale of building material in the hands of manufacturers and jobbers and take it out of the contractor's hands altogether. Under such circumstances the contractor would be a contractor of labor only, if indeed he could exist at all.

If a "quantity survey" is to be made of each set of plans and specifications it must be nearly correct in every detail, and the quantity estimator will require as much time as the architect to do his work right.

Death of William Cromwell Gurney

Wiliam Cromwell Gurney, president of the Gurney Heater Mfg. Co., Boston, Mass., and president and general manager of the Gurney Foundry Co., Ltd., Toronto, Canada, died suddenly in Toronto while visiting the office of his physician for routine treatment. His death was caused by heart failure.

Mr. Gurney was 45 years old and was a son of the late Edward Gurney, whom he succeeded as president of the two companies upon the latter's death a few days ago. He was a member of the National Club, Lambton Golf Club, the Canadian Manufacturers' Association and Board of Trade. He was one of Toronto's best-known business men.

NEW DEVICES

A New Automatic Float Valve for Use in Evaporating Pans in Warm-Air Furnaces.

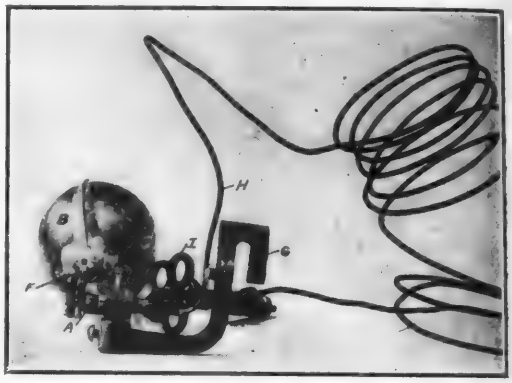
Many kinds of float valves have been used for supplying water to a water-pan located somewhere in a furnace casing. Some have been designed for the purpose, while others have been adapted to this service. Most of these valves have been located in a container outside of the furnace casing. The evaporating pan itself in this case is connected to this outside float chamber with suitable piping. This requires extra piping, an apparatus in the basement that may be in the way and added first cost for the extra water container.

The other type which requires no float chamber outside of the furnace casing, is rigidly connected to the water-pan which must of necessity be slightly movable, due to the expansion and contraction of the furnace. This, of course, is an undesirable condition when the connection is below the water level.

The chief difficulty resulting from the use of automatic float valves in warm-air heaters is on account of the type of service to which the valves are subjected. The evaporation from the water pan is relatively very slow, and the amount of water to be supplied varies from nothing to less than a gallon an hour. This means that the valve will operate "cracked open" very slightly. The velocity of the water through this "crack" will be high when the valve is connected to the city water supply. Invariably this small stream of water occurs on one side only of the valve seat and in a relatively short time a groove is worn on the valve seat. This causes leaks when the valve should be shut off and may lead to damage if not noticed in time.

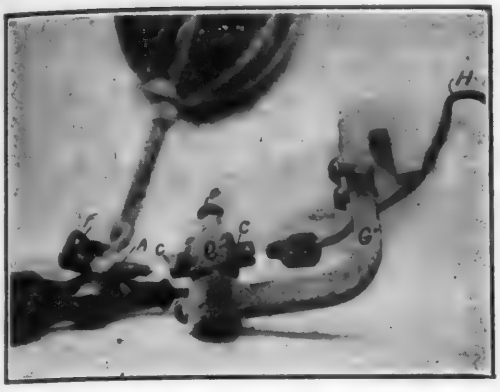
In a new type of valve designed for this purpose (Patent No. 1,310,085) an effort has been made to produce, as far as possible, a "fool-proof" instrument. Referring to the illustration, the needle valve A is made of German silver and it seats against brass. This avoids corrosion at this vital point. The valve opens by the float B dropping with the water and backing the needle A off its seat through the rotation of the triple pitch screw on the needle stem. The height of the water can be varied by the rotation of the whole valve seat member C in its containing member D. This rotation of the valve seat is accomplished by unloosening a set screw E and slipping the barrel out of its containing member D far enough so that the grooves are disengaged and it can be rotated. When this is at the correct position it is slipped back into engagement with these grooves again and the set screw screwed down to hold it in place. Thus it is possible, by starting the triple thread on the needle at different positions, to set the seat in different rotative positions and thus equalize wear on the vital parts.

The float B is connected to the needle by a lost motion device F which allows the water to fall slightly without motion of the needle. Then when the lost motion device takes hold and turns the needle back off its seat, the water pressure will back it all the way off to the limit of the lost motion device. This causes a rush of water through the valve opening that cleans out the dirt that may be lodged there, and this operation reduces the wear as the valve does not operate continually by being cracked open.



CONSTRUCTION OF AUTOMATIC FLOAT VALVE FOR EVAPORATING PANS.

The valve bracket G is made with an adjustable clamp that can grasp the edge of any container which is to be kept full of water. The connection from the water supply line to the valve is made by a flexible hollow copper wire H of 1/8-in. or 3/16-in. outside diameter. An ordinary valve I is used at the water-supply line so that the float valve can be turned off at any time. The flexible connection to the tank in the furnace makes it possible to remove the whole valve from its tank by loosening the two set screws on the bracket G. This feature facilitates installation, inspection and repairs.



DETAIL OF VALVE PARTS SHOWING HOW "D" ROTATES AND ALLOWS FLOAT TO TAKE ANY POSITION.

This valve is now being used on some humidifying tests in connection with warm-air furnace heating, at the University of Illinois. The work is being carried on under the head of Warm Air Furnace Research, and is being partly financed under a co-operative agreement with the university, by the National Warm Air Heating and Ventilating Association. The float valve was tried out for reliability, in the laboratory, before the tests were started. The amount of water it handled under 40-lbs pressure and through about 8 ft. of 1/8-in. wire, varied from 75 to 200 gal. of water in 24 hours. The lowest figure represents the amount of water handled when the float had dropped but 3/4 in. The larger figure represents the amount of water when the float was down as far as it could go.

A rather crude model of this valve was in service two years, without once failing to operate, before it was perfected and patented. A few valves have been made recently for experimental purposes. It is not yet on the market as the patent rights are for sale. If the patent rights are not sold, a company will probably be formed to manufacture and market them on a large scale. The market it is felt, is very large for a good valve of this kind, as it can be sold at a relatively small cost, and can be quickly and easily installed in any water pan in any furnace. Furnace manufacturers are expected soon to equip their products with proper humidifying devices and they will be large consumers of a reliable automatic float valve.

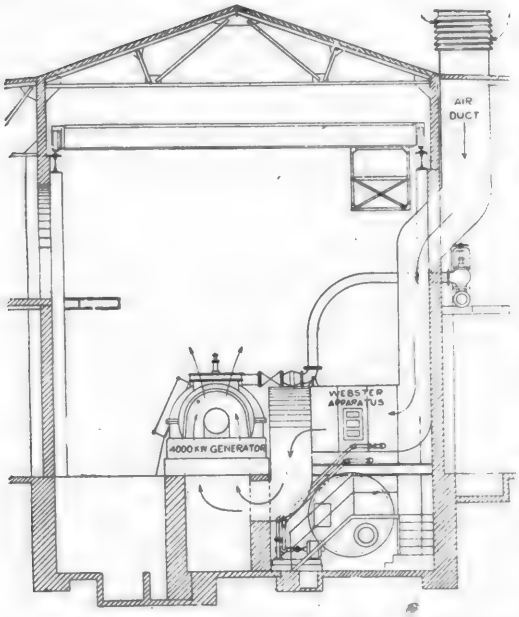
The valve is readily adaptable to many other uses than that of humidification in connection with warm-air furnaces. It is the invention of Ward E. Pratt, 104 M. E. Laboratory, University of Illinois, Urbana, Ill.

Trade Literature.

McAlear Specialties for all Steam Heating and Power Plants, showing the extensive line that has been developed by the McAlear Mfg. Co., Chicago, Ill., are presented in a catalogue just issued by this company (Catalogue No. 25). Particular attention is called to the fact that the McAlear specialties are the result of years of study on the part of their engineering staff, and that the highest grade metal procurable has been used in their construction. The McAlear Acme vacuum-vapor pressure regulating valves, with increased outlet, are given first place in the catalogue, followed by other types of regulating valves, automatic relief valves, boiler protection valves, water regulating valves, altitude valves, water-piston actuated float valves, pump governors, vacuum water jet controller, suction strainers, condensation receivers and automatic pump regulators, feed-line valves, and excess pressure pump governors. The description of the McAlear hot water temperature controllers is accompanied by full installing and operating directions. This also applies to the description of the McAlear high and low-pressure damper regulators. Other devices featured are the McAlear vapor regulator, steam pressure regulator, special valves for various duties, exhaust heads, steam separators, grease extractors, various types of steam traps, the McAlear thermostatic trap, and other specialties. Size 6 x 9 in. Pp. 96.

Fluid Meters for Low-Pressure Gas and Air, designed to give the same power and accuracy on 2-in. water differential as the company's standard fluid meter gives on 2 lbs. differential, has been brought out by the Bailey Meter Co., Cleveland, O., and is the subject of a new bulletin (No. 30). Size 8 x 10½ in. Pp. 16.

Webster Air Conditioning Apparatus for Generator and Transformer Ventilation is the subject of two recent bulletins (Nos. 450 and 540) in the new series being issued by the Atmospheric Conditioning Corporation, Philadelphia, Pa., manufacturers of the Webster line of air washers and air conditioning equipment. The necessity for supplying clean, cool air for the ventilation of turbo generators and electric transformers is clearly set forth and the adaptability of the Webster equipment for this purpose is explained at length, a number of typical installations being shown which have been effective in securing the desired results. An interesting cooling chart is included, showing the cooling effect obtained with a Webster Type G-C and Type G-W



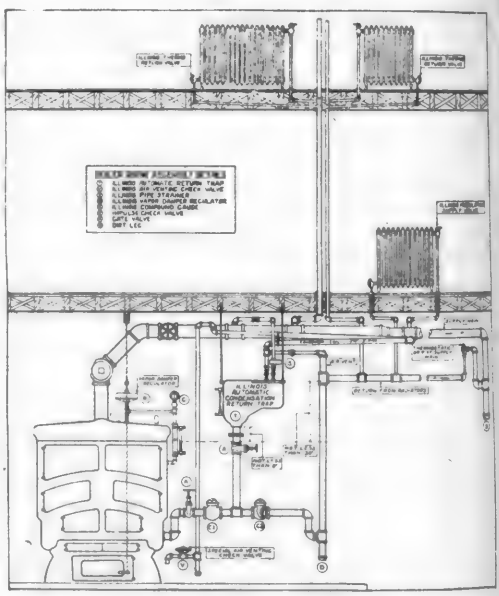
CONVEYING AIR TO A TURBO-GENERATOR THROUGH A WEBSTER APPARATUS.

apparatus, using recirculated water. The use of Webster air conditioning apparatus for engine-room ventilation is also taken up. Bulletin 540 is a reprint of a discussion of "Ventilation Systems for Steam Turbine Alternators," by E. Knowlton and H. Freiburghouse. The company reports a large increase in its volume of business and the management is to be congratulated on the rapid strides being made under the present organization. Size of each bulletin 6 x 9 in. (punched for binding). Pp. 32, each.

BUILDING BUSINESS FOR YOU is the way the Minneapolis Heat Regulator Co., Minneapolis, Minn., describes its campaign of national magazine and newspaper advertising in a recently-issued blanket circular, in which are reproduced many of the company's display advertisements. The company has prepared a series of ready-to-run cuts with spaces left for the names of individual firms of heating contractors which are suggested for use in local newspaper advertising.

TRANE VAPOR HEATING, describing this system as applied to installations using radiator traps and direct-return traps, and involving systems of more than 400 sq. ft. of radiation, is featured in a characteristic bulletin (No. 10) issued by the Trane Co., La Crosse, Wis. Trane systems, it is pointed out, are intended to be installed by local heating contractors in accordance with plans and specifications furnished by the company. Due to the small piping, it is added, it is easy to place the system in old houses as well as in new. The principal devices used consist of Trane graduated radiator valves, Thermetal traps placed on the return ends of the radiators, and special appliances at the boiler consisting of the Trane direct-return trap, float-vent trap and sensitive damper regulator. Size 6 x 9 in. Pp. 16.

ILLINOIS THERMO MODULATING SYSTEM OF VAPOR HEATING, manufactured by the Illinois Engineering Co., Chicago, Ill., is brought to the attention of the New York and eastern trade generally by the DeVed-Kissick Co., New York, which is handling the Illinois line of vapor and vacuum heating specialties in the New York territory, A. L. Browne having direct charge of this department. The DeVed-Kissick Company announces that it carries in New York a stock of parts of such size and variety that small orders can be filled immediately on call. The circular containing this announcement then takes up some of the salient features of the Illinois heating system, special attention being called to the rugged simplicity of the Illinois Thermo trap used on the return end of the radiator and the Illinois automatic return trap which is designed to automatically return the condensate to the boiler regardless of boiler pressure, up to 8 lbs., at the same time discharging the air. A typical boiler-room assembly is also presented in which the location of the various specialties used with the Illinois system are indicated. The circular



BOILER ROOM ASSEMBLY OF ILLINOIS STEAM SPECIALTIES.

concludes with a notable array of users of this system in the metropolitan district.

WEATHER, AND THE STORY OF HOW IT IS MANUFACTURED is the novel title of a new booklet published by the Carrier Engineering Corporation, New York, and devoted to the achievements of the "mechanical weather man." This character, with his resemblance to a control valve, was originated by the company and embodies an idea that was quick to be appreciated in the trade and is well expressed in the company's motto, "Every day a good day." The significant statement is made on the opening page that "two men, Carrier and Lyle, had an idea about making weather mechanically and today their apparatus is manufacturing more than 400,000,000 lbs. of made-to-order weather every working day." The four basis principles of air conditioning are given as the positive, automatic control of (1) the temperature, (2) the humidity, or the amount of water-vapor mixed with air, (3) the cleanliness and (4) the effective distribution of the air. This and many other points are explained in the language of "the mechanical weather man" who proceeds to tell how manufactured weather is applied in the manufacture of aeroplanes, various textiles, candy, bread, rubber products, chewing gum, etc. These are accompanied by photographic illustrations of typical installations and there are also views of the dehumidifier installation and ejector nozzles at the Perryville, Md., ammonium nitrate plant. How air conditioning is applied to printing, especially process work, is covered, as well as other manufacturing lines. Excellent likenesses are reproduced in full-page size of Willis H. Carrier, president and chief engineer of the corporation; and of J. Irvine Lyle, treasurer and general manager. Size 6 x 9 (bound in boards). Pp. 62.

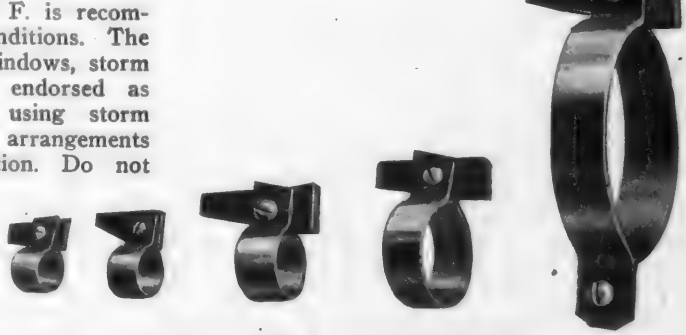
SAVING FUEL IN HEATING is the title of one of the Thrift Leaflets (No. 12), issued by the Department of Agriculture and Treasury Department in connection with the government's "war savings" campaign. An indoor temperature of 68° F. is recommended under ordinary conditions. The use of weather strips, storm windows, storm doors and drawn shades is endorsed as means for saving heat. In using storm windows, it is pointed out, arrangements should be made for ventilation. Do not heat unusued rooms, urges the leaflet, although pains should be taken to guard against the freezing of the water radiators in such rooms, where a water heating system is installed.

HARTMANN RADIATOR BRACKETS, manufactured by the Charles Hartmann Co., 985 Dean St., Brooklyn, N. Y., which were described in a recent issue, are shown in the accompanying illustration. They are intended to be fastened directly to the wall

HARTMANN RADIATOR BRACKET.

with expansion bolts or lag screws, so that no wood strips are needed. The bolt holes are oval, so that the brackets may be easily adjusted to give the right pitch. The brackets are made of pressed steel. They can be used for wall radiators or 1-col., 2-col., 3-col., or 5-col. radiators.

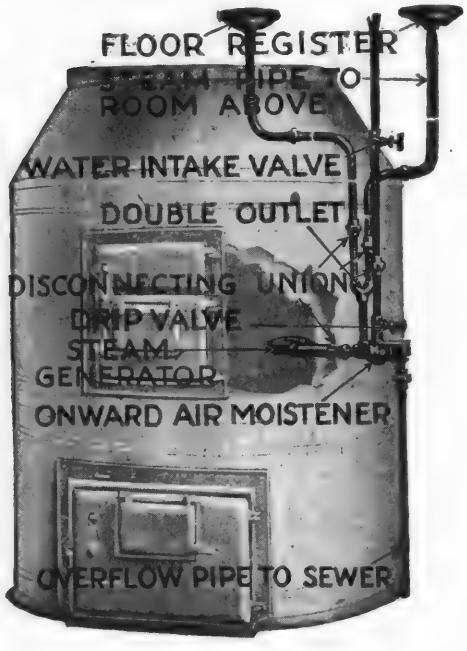
WAYMAN CONDUIT HANGER, described as a time-saving device for use on structural steel work, either of permanent or temporary character, is described in recently-issued circulars received from the Efficiency Electric Co., East Palestine, O. It is stated that the conduit hanger holds the lines snugly to girders and columns and requires neither tapping or drilling for installation.



WAYMAN PIPE CONDUIT HANGER.

ONWARD AIR MOISTENER, made in various designs for warm air heaters and for water, steam and vapor heating boilers, is a unique device brought out by the Onward Mfg. Co., Menasha, Wis., and featured in a recent catalogue issued by the company. In this attachment cold water is admitted to the small reservoir, filling it to the top of the adjustable overflow. The water then flows into the steam generator which is placed in the combustion chamber. The steam generated then passes, in the case of steam and water heating boilers, to branch tees placed on the backs of the radiators, and, in the case of warm air furnaces, to the spaces beneath the floor registers. The attachment is arranged so that the entering water is partially heated before entering the steam generator. It can also be used on gas or electric plates in apartment houses. The radiator tees, which have outlets to admit the vapor directly to the room, are made in two sizes. They may be used under or back of the radiators. Pipes placed in the outlets come up between the sections. In operation, it is stated, the steam is not visible where a sufficient number of tees is used.

CONSTRUCTION OF ONWARD AIR MOISTENER.



ONWARD AIR MOISTENER ATTACHED TO WARM AIR FURNACE.

CORRESPONDENCE

Crude Oil and Kerosene Burners

EDITOR HEATING AND VENTILATING MAGAZINE:

Do you know of any crude oil or kerosene burners that can be used on low-pressure steam boilers, or possibly gas burners, if same can be used economically. Your attention will be appreciated.

B. R. Co.

New York.

We assume our correspondent's inquiry is induced by the present coal stringency, and with the idea that he can discover a new or substitute fuel which will replace the more common one. While it is not at all impractical to burn oil for steam producing purposes, such installations are, in almost every case, located in high-pressure steam plants. Recently, however, as described in last month's issue, some notable installations have been made in house-heating boilers in which use was made of a turbine burner for atomizing oil with air.

Crude-oil (or petroleum) itself is not so much used for fuel purposes as the commodity termed in the trade as "fuel oil." Fuel oil is the residuum left from crude petroleum after the lighter and more volatile constituents (such as naphtha, gasoline and kerosene) have been driven off by partial distillation. Owing to the higher flash point of fuel oil it may be more safely used than crude oil and its heating value is if anything, slightly higher.

As a comparison between oil and coal in heating effect it may be said average fuel oil has a colorific value ranging from 18,000 to 22,000 B.T.U. per pound, while coal will run from 10,000 to 14,000 B.T.U. per pound. The oil-burning apparatus will usually possess a higher efficiency, sometimes going up to

75% under regular operating conditions, while the average coal heating boiler seldom goes above 60%. This results in 1 lb. of oil evaporating about 15 lbs. of water and 1 lb. of coal 8 to 9 lbs. of water.

A ton of coal contains 2,000 lbs, which at 13,000 B.T.U. per pound and 60% efficiency means:

13,000 B.T.U. × 2,000 × 60% = 15,600,000 B.T.U. delivered to the steam per ton of coal burned.

A barrel of oil contains 42 gal. of oil which at 6.8 lbs. per gallon, 19,000 B.T.U. per pound and 75% efficiency means: 19,000 B.T.U. × 42 × 6.8 × 75% = 4,069,800 B.T.U. delivered to the steam per barrel of oil burned. 15,600,000/4,069,800 = 3.8 bbls. of oil to equal one ton of coal.

If, roughly speaking, 3.8 barrels of oil equal one ton of coal (in heating effect) then, with oil at 90c per barrel, the cost of oil will be about the same as coal at $3.40 per ton and where oil can be procured at 50c per barrel cost at $1.90 per ton is equivalent.

The burners or injector nozzles for oil are made in a variety of forms, but operate largely along similar lines, the steam and air method of atomizing the oil being the most common scheme used. Burners of this type are employed on the Russian railways, the Southern Pacific railroad and in the Oil City and F. M. Reed burners. All of these require high-pressure steam, while other burners (operating under compressed air) require the services of an auxiliary air compressor.

It must be understood that the burning of fuel oil under a steam boiler can only be accomplished with the use of suitable burners which atomize the oil to such an extent that each particle is brought into contact with the air necessary for combustion before coming into contact with any heating surface, a

The *advantages* of oil fuel may be summed up as follows:

Cost of delivery, handling and burning is lower than coal.

The storage space required is much less.

Higher efficiencies are obtainable.

Temperatures obtained are more constant.

Better regulation is procured.

The *disadvantages* are as follows:

More dangerous to handle.

Requires special burners.

Leaks give rise to danger from fire and disagreeable odors.

Owing to the higher temperatures, greater cost of repairs and upkeep on the boiler may be expected.

City ordinances may limit or hinder in its use to a point practically prohibitive.

A special furnace of highly refractory material should be used.

As far as gas boilers are concerned they are manufactured and used to a considerable extent, one common form consisting of a multitude of copper coils similar to those used in gas hot-water heaters but such boilers have never proved economical except where natural gas is available. A cubic foot of natural gas has about 1,000 B.T.U., while municipal gas usually runs 500 to 600 B.T.U. per cubic foot.

As gas-fired boilers may have efficiencies as high as 90% this means that natural gas would deliver 1000 × 90% = 900 B.T.U. and municipal gas would deliver 550 × 80% = 500 B.T.U. for every cubic foot burned. Since a ton of coal delivers 15,600,000 B.T.U. it will take:

15,600,000/900 = 17,333 cu. ft. of natural gas,

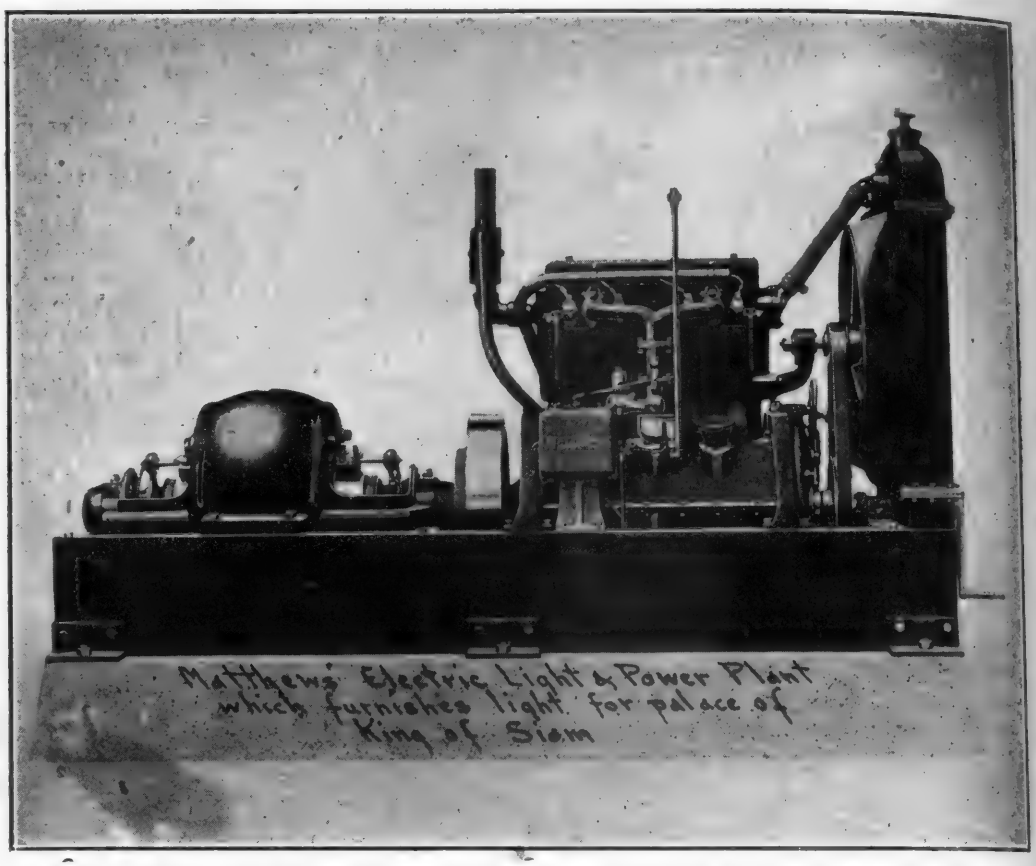
15,600,000/500 = 31,200 cu. ft. of municipal gas to

equal one ton of coal. With coal at $10.00 per ton, natural gas would have to cost 58c per 1,000 cu. ft. and municipal gas 32c per 1,000 cu. ft. to compete commercially with coal.

As far as kerosene is concerned, it will raise the insurance rate on the building and has in general been found so unsatisfactory as to cause some manufacturers formerly making such boilers to abandon their manufacture. Another point against its use is that in any time of coal stringency its price would rise to an exhorbitant figure or it might be totally unprocurable owing to the great demand for it to burn in the common oil heaters used so much in single rooms and apartments

---

The accompanying illustration shows a 5 K. W. electric plant recently sold to the King of Siam to furnish light and power for the royal palace. It is a Matthews full automatic electric light and power plant, for which the Consolidated Utilities Corporation, Chicago, are factory distributors.



5 K. W. ELECTRIC LIGHT AND POWER PLANT INSTALLED IN PALACE OF KING OF SIAM.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF THE HEATING AND VENTILATING MAGAZINE, published monthly at Cooperstown, N. Y., for October 1, 1919.

State of New York.
County of New York, ss.

Before me, a notary public in and for the State aforesaid, personally appeared A. S. Armagnac, who, having been duly sworn, according to law, deposes and says that he is the Editor of THE HEATING AND VENTILATING MAGAZINE, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443 Postal Laws and Regulation printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher editor, managing editor, and business managers are:
Publisher, Heating and Ventilating Magazine Co., 1123 Broadway, New York, N. Y.
Editor, A. S. Armagnac, 1123 Broadway, New York, N. Y.
Managing Editor: None.
Business Manager, Gustave Petersen, 1123 Broadway, New York, N. Y.

2. That the owners are: (Give names and addresses of individual owners, or if a corporation, give its name and the names and address of stockholders owning or holding 1 per cent or more of the total amount of stock)
Heating and Ventilating Magazine Co., 1123 Broadway, New York ,N. Y.
A. S. Armagnac, 1123 Broadway, New York, N. Y.
Gustave Petersen, 1123 Broadway, New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:
None.

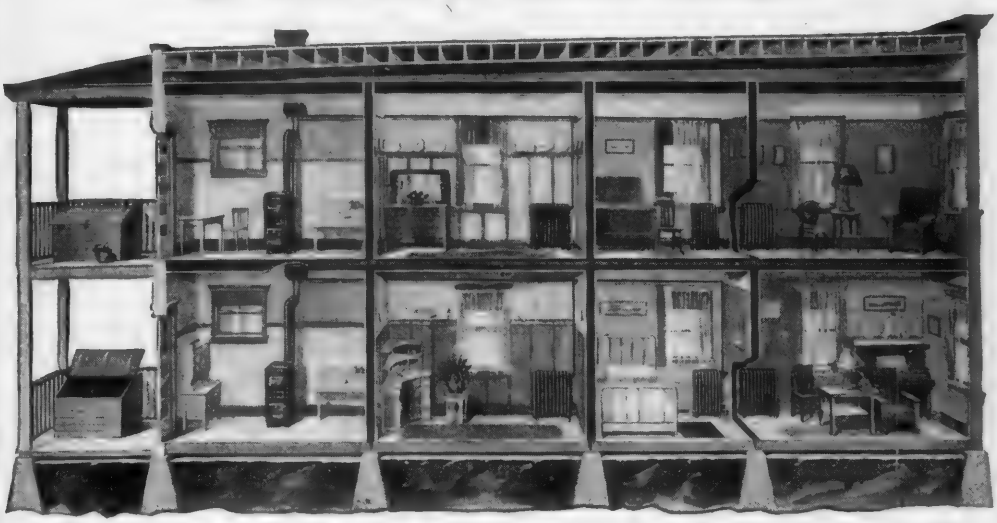
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustee, hold stock and securities in a capacity other than that of a bona-fide owner and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

A. S. ARMAGNAC, Editor.

Sworn to and subscribed before me this 15th day of October, 1919.

A. J. VANDEW BULCKE,
Notary Public, Bronx County, New York.
Cert. filed in New York County.
(My commission expires March 30, 1920.)

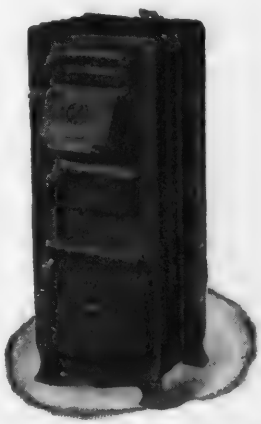
IDEAL-ARCOLA
Radiator–Boiler
Hot Water heat for cellarless buildings!



The permanent solution of the heating problem for group flat buildings such as the above is found by specifying the IDEAL-Arcola Radiator-Boiler. Each tenant operates his own heating system.

The IDEAL-Arcola Radiator-Boiler is specially designed to fill the individual heating demands of factory and community housing plans. For individual or groups of cottages, houses, flats, stores, schools, stations, etc. Great fuel saving, together with the desirable and equitable warmth of Hot Water Heating, is secured.

Write today for special literature illustrating and describing the IDEAL-Arcola



IDEAL-Arcola Radiator-Boiler
Takes the place of the parlor stove and sends its excess heat to AMERICAN Radiators in adjoining rooms. No cellar required.

AMERICAN RADIATOR COMPANY

Sales branches and showrooms in all the large cities

VAPOR HEATING.

The Adsco System.

(Continued from Data Sheet No. 132-A.)

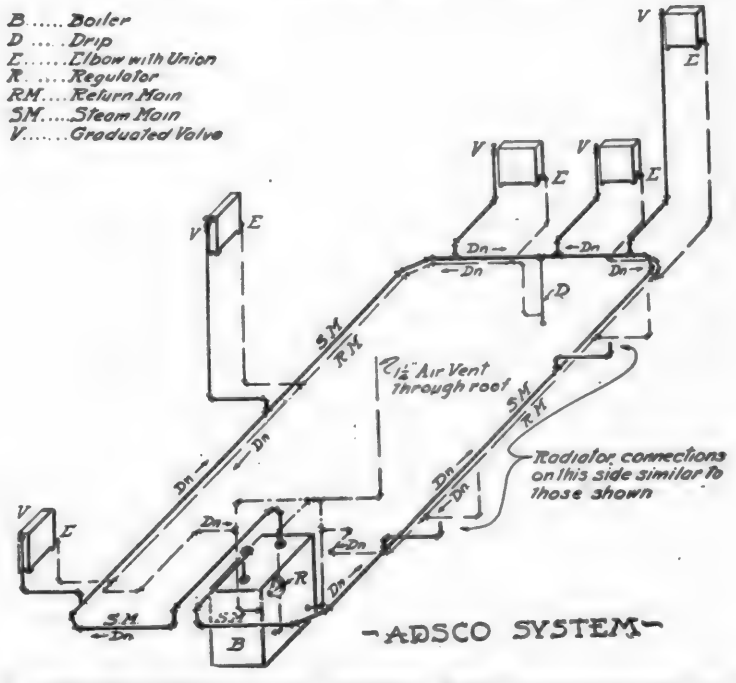


FIG. 2—ARRANGEMENT OF ADSCO SYSTEM WITH INDEDENDENT BOILER.

If a steam boiler is used the piping should be run as shown in Fig. 2 and the boiler load will only be 80% of the total radiation, plus the steam main loss (not over 10%), making the total required boiler capacity 90% of the total radiation; to control the boiler pressure a special regulator is used, this being illustrated in Fig. 3. It consists of a weighted float which rises on the surface of the water inside of the vented regulator. This float is connected to a lever operating the draft and check dampers. The creation of any pressure in the boiler backs the water into the regulator and raises its water-line, thus operating the float. The safety valve used on the boiler is set to relieve at 15 oz. pressure but can readily be adjusted down to 11 oz. if desired; its tapping is 1¼-in. size.

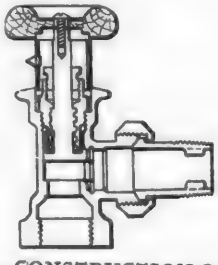
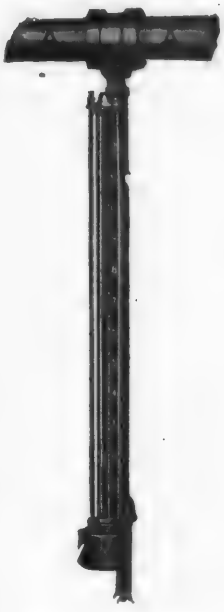


FIG. 2-A—CONSTRUCTION OF ADSCO VALVE.

FIG. 3—SPECIAL BOILER PRESSURE REGULATOR.

(Concluded on Data Sheet No. 132-C.)



VAPOR HEATING.

The Adsco System.

(Concluded from Data Sheet No. 132-B.)

FIG. 4—WATER GUAGE.

FIG. 5—MERCURY GUAGE.

FIG. 6—PIPE RECEIVER.

To accurately register the small amounts of pressure generated either the water gauge illustrated in Fig. 4 or the mercury gauge shown in Fig. 5 may be used. The water gauge is generally used on district heating systems but the mercury gauge may be applied to either.

The steam main in the basement should be arranged so as to secure the best circulation and with the minimum drop in pressure. In all changes of direction on the main, bends, long sweep or 45 deg. fittings should be used, and the size of the steam main should at no point be decreased below 1½-in.

The steam is carried in the steam main up to a point within four feet of the graduated radiator valve; at this point the radiator branch is reduced to ¾-in. in size as all radiator valves have ¾-in. thread. The interior construction of the valve is illustrated in Fig. 2-A, and it is designed to supplya given radiator with 80% of the amoum of steam it can condense under ordinary operating conditions and with 5 oz. of steam pressure on the supply pipe to the valve; the proper size of radiator is stamped on the valve top and the valves are made with stampings in multiples of 5 from 10 sq. ft. to 200 sq. ft.; for this reason the size of the radiator must always be specified in ordering valves.

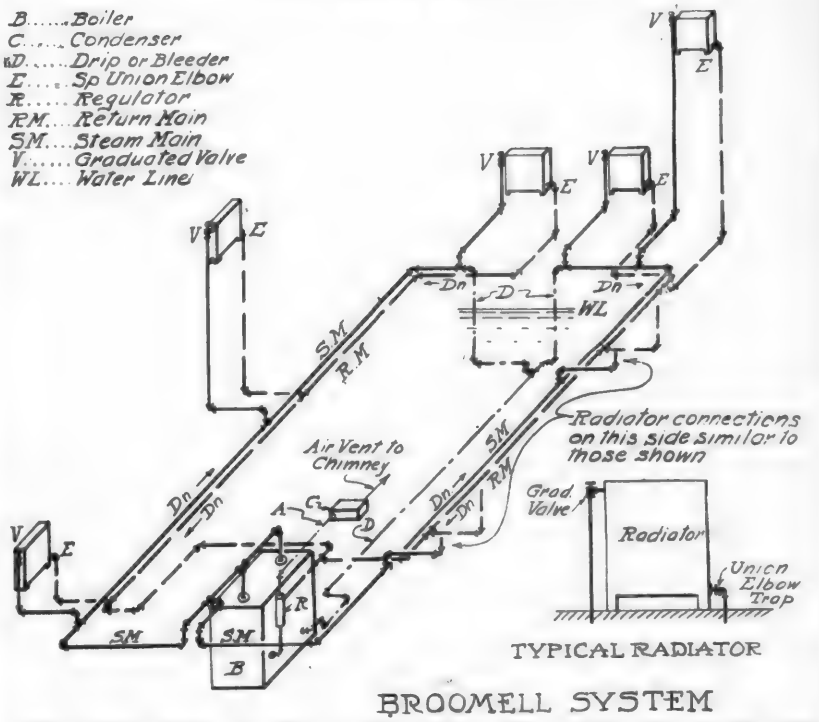
The radiators used are common cast-iron surface, of water pattern.

The return lines serve to convey the water of condesation, together with the air, back to the point where the air separation takes place. In systems supplied from a street main and provided with a condensation meter a receiver is used, this being illustrated in Fig. 6. Such receivers have a minimum water depth of 30-in. and the outlet pipe to the meter carried up to a height 8-in. below the top. In Fig. 6, A indicates air vent pipe; B, return lines and C the outlet to the meter. The diameter of these receivers is recommended to be as follows:

Radiation Sq. Ft.	Diameter of Receiver Inches.
600	5
1200	6
2000	8
6000	10
12000	12
20000	16

The air pipe is usually made 1¼-in. and the air lines should be run at least 12 to 15 ft. above the water-line, terminating outside the building wall or carried up through the roof.

VAPOR HEATING.
The Broomell System.



BROOMELL SYSTEM

The general scheme of piping is illustrated in Fig. 1. The pitch of the steam main is downward in the direction of flow and should not be less than ½-in. in 10 ft., with more if possible. Where circumstances make it necessary to pitch the main or its branches back against the steam flow the pitch should not be less than 2-in. in 10 ft., with more if possible. The size of the main is determined by the schedule shown in following:

Radiation. Square Feet	Supply. Inches Diam.	Return. Inches Diam.
100- 300	2½	1
300- 500	3	1¼
500- 900	3½	1½
900-1500	4	1½
1500-2000	4½	2
2000-3000	5	2½
3000-5000	6	2½
5000-9000	7	3
9000-14000	8	5

The drop in pressure is so small when the steam main is sized on this schedule as to sometimes be less than 2 oz. in a 12-story building, and the cross sectional **area will be found to be about 0.009 sq. in. per square foot of radiation.**

The risers are sized from the schedule shown below:

Radiation Square Feet	Supply Inches Diam.	Return Inches Diam.
100-Less	1	¾
100- 200	1¼	¾
200- 300	1½	¾
300- 500	2	1
500- 800	2½	1
800-1000	3	1¼
1000-1200	3½	1½
1200-	4	1½

(To Be Continued.)

VAPOR HEATING.

The Broomell System.

(Continued from Data Sheet No. 132-D)

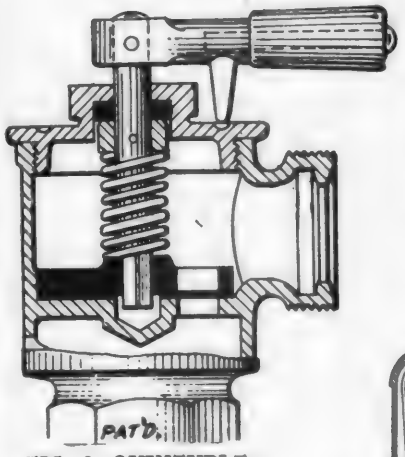


FIG. 2—QUINTUPLE VALVE.

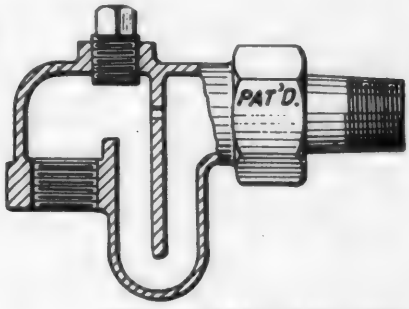


FIG. 3—DIRECT-RADIATOR RETURN CONNECTION.

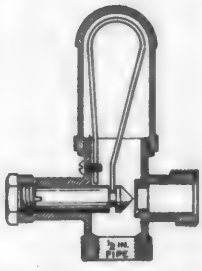


FIG. 4—INDIRECT-RADIATOR RETURN CONNECTION.

The interior construction of the "Quintuple" valve is shown in Fig. 2. Supply valves are made in six sizes for ¾-in. pipe and one for 1-in. pipe (No. 6). The sizes of the valves used on various capacity radiators is given in Table III.

TABLE III

Size of Radiator Square Feet	Valve
Up to 15	No. 0
15 to 35	No. 1
35 to 70	No. 2
70 to 100	No. 3
100 to 140	No. 4
140 to 200	No. 5
200 or more	No. 6

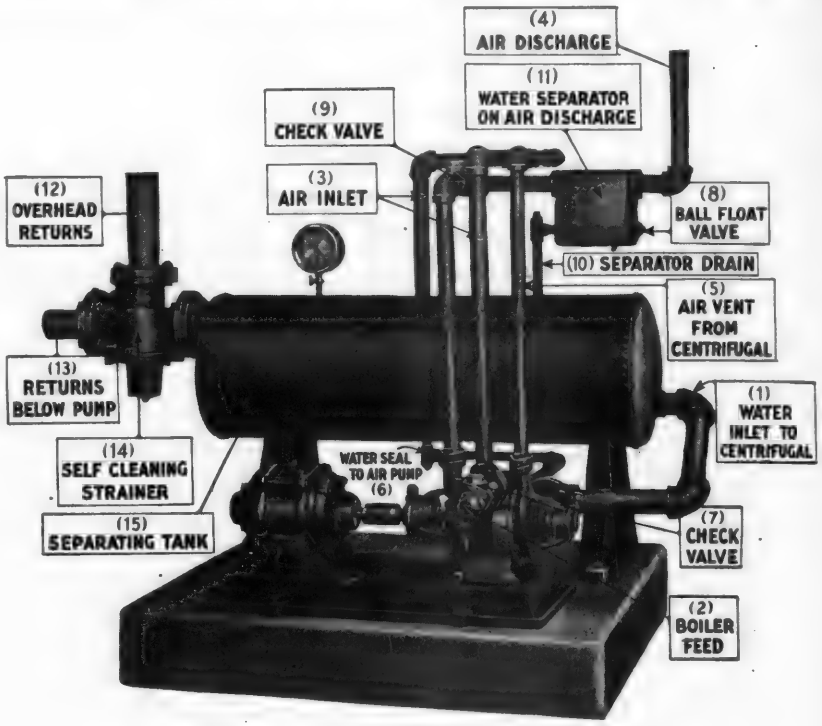
Valves Nos. 0 to 5inc. have ¾-in. tapping; No. 6 has 1-in. tapping.

The radiators have top inlet and bottom outlet at opposite ends and are, of course, of the water type; the surface is figured on the basis of 200 B. T. U. per square foot of radiation and no addition is made for "condensing" as the vapor heats the radiator all the way up to the return end.

On the return connection of all direct radiators a special water-sealed union elbow is used, its construction being illustrated in Fig. 3. The design of this ell permits the ready flow of condensation through the water seal, while the air is relieved gradually through the small by-pass hole in the partition above the seal. On the return connection of indirect radiators, a return trap is used, shown in Fig. 4. The operation of this return trap is intended to prevent any loss of vapor through the return should the heat register or cold-air damper be closed, preventing the circulation of air through the radiator. From the return ells the air and condensation flow back to the main return pipe and thence to the water seal at the top of the receiver.

(To Be Continued.)

Efficient Heating
demands the JENNINGS PUMP



Size C for 26,000 square feet radiation, requiring only 2 H. P. Motor at 1,720 R. P. M., when delivering from a vacuum 10 inches mercury against a boiler pressure of 10 lbs.

The Jennings Pump consists of two independent turbine units, an air pump and a water pump, combined in one casing, with the impeller of each mounted on the same shaft.

One unit continuously exhausts air and vapors from the heating system, and the other removes the condensation as it accumulates and forces it directly into the boiler, or up to the hot-well.

The boiler pressure is against the water only. The air and vapor, representing approximately four-fifths of the volume handled, are delivered to the atmosphere *without back pressure. The saving in horse power amounts to over 50 per cent.*

The Pump is bronze fitted throughout. The shaft is tobin bronze. The air rotor water impeller, lobe, port plate, sealing rings and clamping nuts are bronze. The shaft is supported on high grade annular ball bearings mounted outside of the pump casing.

Write for Bulletin No. 8

NASH ENGINEERING CO.

SO. NORWALK, CONN., U. S. A.

TRADE AND MISCELLANEOUS NOTES

Miscellaneous Notes.

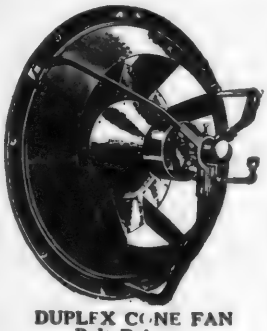
San Francisco, Cal.—Representative architects, contractors, builders and leaders of organized labor engaged in the building industry in San Francisco have adopted a code of ethics and trade rules for the government of the building business.

Resolutions were unanimously adopted embodying the following principles:

1. All bids should be opened in public.
2. Bids should not be submitted both as a whole and in segregated form at the same time.
3. General contractors should not sublet work to the extent he becomes merely a broker.
4. Peddling of bids should be stopped.
5. Contractors should not furnish plans for heating, electrical or mechanical equipment or layouts on which bids are to be submitted by other contractors.
6. Architects should determine the competency of all bidders in advance of taking bids and be prepared to give the work to the lowest bidder.
7. Architects should not act as contractors.
8. That a joint arbitration committee having proportional representation from all interested organizations in the building business with authority from their organizations be formed to settle all disputes.

Massachusetts Institute of Technology Fund reached $1,500,000 up to October 20, according to an announcement of President Richard C. MacLaurin. The "Mysterious Mr. Smith" will give the institute the $4,000,000 which he has promised provided $3,000,000 is subscribed by alumni and friends before the first of the year. If these subscriptions should total $4,000,000, "Mr. Smith" has consented to reveal his real name. There are 3001 students at the institute this fall. The average attendance before the war was 2,000.

New express packing rules, similar to those required for freight movements on



DUPLEX CONE FAN
Belt Driven

HOWARD & MORSE
45 FULTON ST., N. Y.
Ventilating Engineers and Contractors
MANUFACTURERS OF
BLACKMAN and DUPLEX CONE FANS
which are installed by us complete with **Motors, Duct Work and Wiring.**

Aligning, Rigging and **Hoisting** done, with labor thoroughly qualified from long experience.

We make a specialty of **Kitchen Exhaust** work. Prominent buildings, hospitals, theatres, and private residences are among our many and recent installations.

The **Duplex Cone** Fans are semi-conoidal fans, made especially to operate against pressure in duct systems.

The **Blackman** Fans are used for fresh air delivery and in duct systems, when no great pressure is involved.

You can have the advantage of our experience.

SEND FOR CATALOGUE

BLACKMAN FAN
Direct Connected to Motor

the railroads, will go into effect December 10, and express shippers are requested to prepare themselves for the new standards. Heretofore shippers have been using all sorts of containers for express packages, but the new rules are expected to make the regulations uniform. The rules, recently promulgated, will not permit the use of paper wrapping for packages over 25 lbs, nor or ordinary paper boxes, wrapped or unwrapped, when the weight of the package is over that limit. For shipments over 25 lbs., wooden containers, or containers of fibreboard, pulpboard of corrugated strawboard material are required. The cartons must be made of materials of specified "test strengths," similar to those required for the freight service, and the containers must bear the stamp of the manufacturers certifying that the material used is of strength required for the weight of the shipment carried in it, as called for in the rules.

American Malleable Castings Association reports, in connection with the insistent demand for malleable castings, that this condition has been anticipated and that ample facilities have been provided for both the present and future expansion of the industry. It is stated, however, that at the present time the shortage of unskilled labor will not permit this great capacity being

ILGAIR UNIT HEATERS

NOW USED BY MANY OF AMERICA'S INDUSTRIES EVERYWHERE

AMAZINGLY EFFICIENT FOR HEATING IN WINTER AND COOLING IN SUMMER

FORD EAGLE PLANT, DETROIT, MICH.

The above immense industrial plant—the largest of its kind—required abundance of heat. It was economically secured with 60 "ILGAIR" Unit Heaters.

Write for literature describing this outfit and illustrating many important installations.

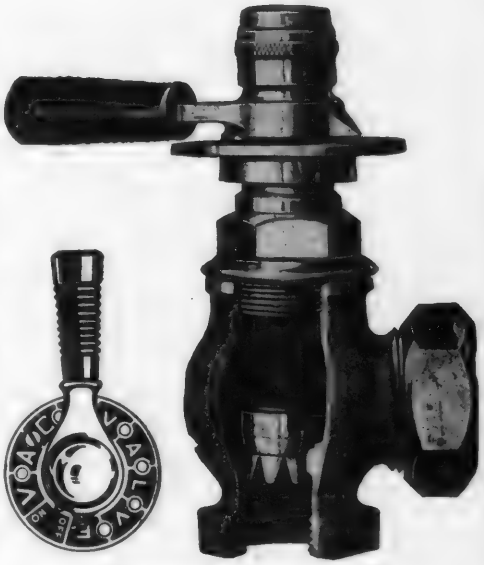
ILG ELECTRIC VENTILATING CO.
158 Whiting St. CHICAGO, ILL.
Branches in all Large Cities

HIGH EFFICIENCY TRADE ILG MARK VENTILATING MACHINERY

DETROIT PACKLESS RADIATOR VALVES

The Correct Radiator Valve for Vapor Heating

The Detroit Packless Vacu Valve is a Graduated Valve for Vapor and Vacuum Systems of Heating. The dial plate is provided with a series of holes and a movable pin. This pin acts as a stop for the handle pointer, and is inserted in the hole in the dial nearest the point at which the valve, when opened, admits only sufficient vapor or steam to fully supply the radiator.



DETROIT PACKLESS
Vacu Valve Showing Dial Plate and Lever Handle

Booklet VP-1 Gladly Sent Upon Request

DETROIT LUBRICATOR COMPANY
DETROIT, U. S. A.
CANADIAN DETROIT LUBRICATOR COMPANY, LTD. WALKERVILLE, ONTARIO

LARGEST MANUFACTURERS OF RADIATOR VALVES IN THE WORLD

used. Fully 200,000 tons of malleable capacity is today idle but would be immediately available if the necessary labor could be secured. Improvement in this direction is not looked forward to with any great hope until the activities of other industries are curtailed or until there is a flow of immigration sufficient to build up the supply of labor available for foundry work. This means, therefore, a large percentage of capacity idle continuously in every plant regardless of heavy unfilled orders.

Fourth New York State Safety Congress will be held in Syracuse, N. Y., December 1-4, 1919, at the Hotel Onondaga. The program for the last day, December 4, will be furnished by the New York State Industrial Commission and will embrace practical safety problems as they arise in the commission's administration of New York's labor laws and Industrial Code.

Engineering Council, on the request of the Associated General Contractors of America and the American Institute of Architects, has appointed Samuel G. Neiler, the well-known Chicago heating and ventilating engineer, as one of three representatives to take up the question of "payment for estimating."

Swiss Economic Mission, which has been making economic studies in this country and which include Konrad Meier, formerly a practicing heating and ventilating engineer of New York, visited the Westinghouse plant in East Pittsburgh and Wilmerding recently. The party first inspected the plant of the Westinghouse Airbrake Company, luncheon being served in the Welfare Building. In the afternoon the party was taken through the plant of the Westinghouse Electric & Mfg. Company, accompanied by a number of guides speaking French and German, both languages being extensively used in Switzerland.

New York.—The State of New York has opened a Bureau of Employment in Manhattan at 112 West 46th Street, under the State Industrial Commission. The service of this bureau "is offered to the public by the public." There are no fees or charges. The purpose of the bureau is to bring together the employer seeking help and the worker who wishes employment, with the least loss of time and expenditure of money. Other offices are located in Albany, Auburn, Binghamton, Brooklyn, Bronx, Buffalo, Dunkirk, Elmira, Jamestown, Newburgh, Rochester, Schenectady, Syracuse, Troy, Utica, Watertown and Yonkers.

PIPE BENDING

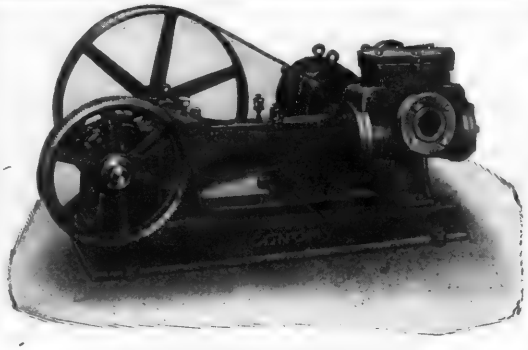
MARINE EQUIPMENT AND REPAIR WORK
HEATING AND VENTILATING

THE OHIO HEATING AND PIPE BENDING CO.

Main Office and Factory, 1061-63 West 11th Street, Cleveland, Ohio

SOLE AGENTS FOR

F. J. Nice Oil and Combination Oil and Gas Burners



This Outfit is Noiseless

Economy Return Line Vacuum Pumps

Electric or Power Driven High Class Bronze Fitted

PRICE CAN'T BE BEAT

Quantity production in specialized lines enables us to make prices that others making a large variety of apparatus cannot meet.

Keep in Step with the Times Be a Specialist

Buy your Return or Air Line Vacuum Pumps, Condensation or Hot Water Circulating Pumps from Manufacturers who specialize in pumps for the Heating Trade.

Don't fail to write for "ECONOMY MANUAL "B." Most complete vest pocket Heating Ventilating Engineer's Hand Book. This publication mailed free on request.

ECONOMY PUMPING MACHINERY CO.
120-128 N. Curtis St., Chicago, Ill.

GET IN THE BIG MONEY CLASS NOW

SANITARY HEATING AND VENTILATING ENGINEERING

SANITARY, Heating and Ventilating Engineering offers wonderful opportunities for advancement and money making right now. Modern methods and appliances are fast replacing the old ones, and the men who are up-to-date—the trained men—the men who know—are going to reap the benefit.

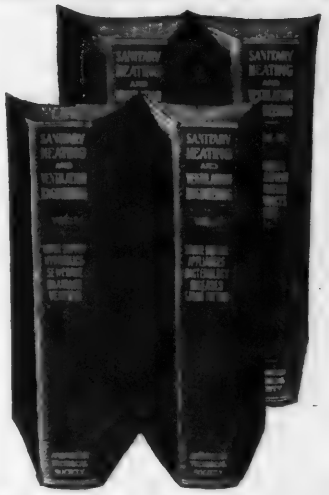
Get your share of the big money now. Here is the first thing for you to do—tear the coupon off this page and mail it to us today. It won't obligate you in any way and you don't have to send a penny, but it will bring you these four big volumes—just off the press—packed full of the very things you need to train yourself—all worked out for you in clear, understandable English by eighteen of the most successful men in these professions today.

No matter what your job is or how much you earn, you need these books—and you need them now. If you are in business for yourself, they will make your business bigger and better—the volume on business management, estimating and contracts and specifications alone will do it.

SHIPPED FREE Examine the books and see for yourself just how valuable they are, but don't send us any money. The little coupon is all you need. Fill out all three lines and mail it NOW. It will bring you the whole set of books by express collect, and you can keep them seven days to use as you please—study them at home—take them to your shop—try to find some problem they won't answer, and ship them back at our expense if you think you can get along without them. If you want to keep the books after seven days' use, send us only $2.00. The balance can be sent in monthly payments of $2.00 each until the special introductory price of **$14.80** is paid.

It will take years of hit-or-miss experience to gain what these books will give you in a short time; so don't pass up this opportunity—ACT NOW. We may never be able to offer this low price and these special terms again—only 7 cents a day. Tear the coupon off now before you lay this down and mail *today*.

AMERICAN TECHNICAL SOCIETY
Dept. H 1078 CHICAGO, U. S. A.



4 big volumes, size 5-1/2 x 8-1/4 inches, bound in flexible American Morocco and trimmed in gold; 1454 pages; over 1100 pictures, diagrams and plates.

HERE'S WHAT THE BOOKS CONTAIN Thousands of problems under the following headings are all worked out and made as simple as A-B-C.

Sanitary Science and Materials.
Water Supply. Hydraulics.
Sewers and Drains.
Drainage and Venting.
Sanitary Appliances. Sewage Disposal.
Bacteriology and Sanitation.
Infectious Diseases.
Steam and Hot Water Fitting.
Domestic Hot Water Supply.
Heating and Ventilating Engineering.
Sheet Metal Work.
Business Management. Estimating.
Contracts and Specifications.
Mechanical Drawing.
General Index and Review Questions and Index to Each Volume.

FREE CONSULTING SERVICE With these books goes free a year's consulting service in the American Technical Society, worth $12.00. This enables you to consult our engineers and experts for one year without charge. Ask as many questions within the scope of the book as you want for one year.

AMERICAN TECHNICAL SOCIETY
DEPT. H 1078 CHICAGO, U. S. A.

Please send me the 4-volume Library of Sanitary Heating and Ventilating Engineering for 7 days' Free Examination, shipping charges collect. I will send you $2.00 in 7 days and $2.00 each month until the special price of $14.80 is paid, and you will send me a receipt showing the books are mine. If I decide not to buy I will return the books in 7 days.

Name.....

Address.....

Reference.....

Chicago, Ill.—Clarence V. Kellogg, president of the Kellogg-Mackay Co., Chicago, knows how it feels to be thrust unexpectedly into the limelight, through the publication of a report in the *Chicago Tribune* for September 30, to the effect that "one thousand new dwelling houses are to be constructed at once on the south side of Syracuse, N. Y." and that "Clarence V. Kellogg, a Chicago business man, who formerly lived in this city, had offered the lots and guaranteed the necessary funds." In denying the report Mr. Kellogg said: "In the first place I have only five lots in Syracuse. They are for sale. I am not contemplating such a project there. The story is without foundation. Moreover, I am not in the building business."

Chicago, Ill.—A marked increase in the number of building permits followed the settlement of the Chicago building strike, which lasted ten weeks. According to Building Commissioner Charles Bostrom, more than $110,000,000 worth of building work was tied up. It is stated that permits for additional buildings are being issued at the rate of $7,000,000 per month, a large proportion of this amount being devoted to private houses and apartment buildings. Reports from the Middle West are to the effect that work generaly is progressing beyond the capacity of the supply houses to handle. The prevailing high prices are more than offset by the almost universal lack of vacant houses, forcing people to build their own homes because they can find no dwellings for rent.

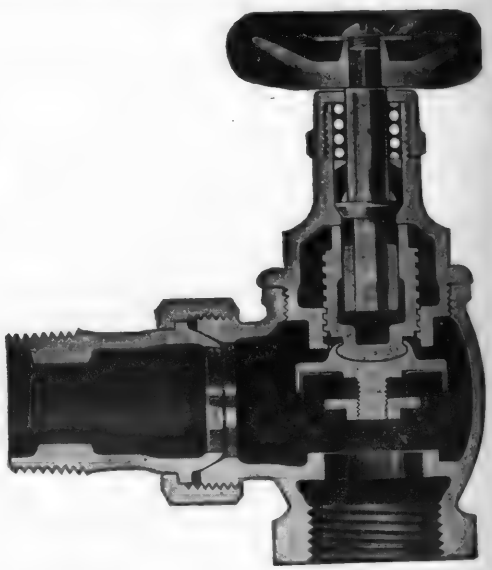
Building Permits for September, 1919, showed a gain of 281% over the corresponding period in 1918. This shows a slight drop in the rapidly ascending curves that has characterized building operations during the previous months of this year. The totals, however, are most impressive, amounting to $137,023,736 for 160 cities, as compared with $35,976,845 for September, 1918. In New York the total, as reported by *The American Contractor*, was $19,025,096, as compared with $3,610,918 a year ago. In Chicago, due to the strike settlement, the figures jumped to $13,483,600 as compared with $2,447,600 a year ago. Other important cities showing increases were: Atlanta $1,113,522, a gain of 211%; Boston $1,910,924, a gain of 310%; Buffalo $1,256,000, a gain of 105%; Cincinnati $1,159,475, a gain of 446%; Cleveland $6,285,625, a gain of 301%; Dallas $1,076,118, a gain of 264%; Detroit $17,343,085, a gain of 552%; Fort Worth $2,115,187, a gain of 2365%; Indianapolis $1,179,469, a gain of 202%; Kansas City $2,117,625, a

MARSH
RE-ENFORCED
PACKLESS
VALVES

QUICK OPENING
Examine Construction Carefully

In this line of Packless and Modulated Valves the Packless Feature is, through construction, special metal composition of Packless bearing and a packing cushion, made PRACTICALLY INDESTRUCTIBLE and, although a POSITIVE seal within itself, it is the ONLY line in which the Packless feature is, through a PACKING CUSHION and a very heavy special spring, AUTOMATICALLY RE-ENFORCED, providing TWO or DOUBLE, INDEPENDENT, POSITIVE, bonnet seals for ALL TIME.

These Valves will withstand high pressures and, therefore, are of superior value for vacuum and low pressure service.



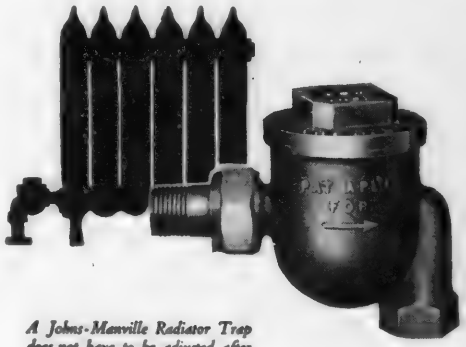
We SPECIALIZE on high grade Radiator Valves and furnish the LARGEST LINE of any company in the business.

Printed matter and prices on application

MARSH VALVE COMPANY, Erie, Pa.

gain of 591%; Los Angeles $2,447,793, a gain of 591%; Lowell $1,062,645, a gain of 6709%; Memphis $1,006,400, a gain of 3499%; Milwaukee $2,464,778, a gain of 345%; Minneapolis $1,892,115, a gain of 406%; Newark $2,428,445, a gain of 418%; Oklahoma City $1,026,389, a gain of 686%; Omaha $1,046,380, a gain of 495%; Philadelphia $5,234,425, a gain of 392%; Pittsburgh $1,169,991, a gain of 59%; Portland, Ore., $377,595, a gain of 289%; Rochester $1,275,765, a gain of 796%; San Francisco $1,231,921, a gain of 54%; Springfield, Ill., $1,154,435, a gain of 1418%; St. Louis $2,844,980, a gain of 824%; St. Paul $1,077,810, a gain of 490%; and Washington $1,129,508, a gain of 366%. The only important cities reporting losses were Birmingham $303,510, a loss of 33%; Camden $249,353, a loss of 31%; Des Moines $1,012,330, a loss of 2%; Huntington, W. Va., $311,935, a loss of 43%; and Seattle $1,340,695, a loss of 4%.

Eastern Supply Association elected the following officers at its Fall meeting, held October 8 in New York: President, Joseph F. Evans, Wyoming Valley Supply & Mfg. Co., Wilkes-Barre, Pa.; first vice-president, A. M. Maddock, Thomas Maddock Sons Co.,



A Johns-Manville Radiator Trap does not have to be adjusted after it is installed.

As a matter of fact, there is nothing to adjust nor to be tampered with.

This is true because temperature does not regulate the trap.

Condensation—water from the radiator which should be discharged—does.

HOW IT WORKS

It's a hollow copper ball that does the work. When there is no water to discharge, the ball is held against the discharge outlet. As water flows into the trap, the ball rolls up, exposing the outlet, and water is discharged. Any air that may be present is also drawn off. When the water level falls, the ball rolls down with it, preventing the loss of steam.

H. W. JOHNS-MANVILLE CO.
New York City
10 Factories—Branches in 63 Large Cities

Through—
Asbestos
and its allied products
JOHNS-MANVILLE
Serves in Conservation
Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

JOHNS MANVILLE
Radiator Trap

Stronger, Heavier Radiator Valves

ONE of the main elements of satisfaction in a heating system, the installation of a strong, heavy radiator valve, is frequently overlooked.

The fact that steam, in the average heating system, is maintained at a low pressure, is no reason why a valve of light construction will prove entirely satisfactory.

Radiator valves are subjected to the severe strains caused by expansion and contraction or lifting and settling in the piping, and to avoid break-downs they must be sufficiently strong to offset this common source of trouble.

Jenkins Radiator Valves are of stronger construction throughout. In their manufacture the best grade of steam metal is used. Their design provides more metal especially at points where the strain and pressure is greatest.

Every installation of Jenkins Valves carries with it two-fold satisfaction—satisfaction for both yourself and the man who pays the bill.

Know genuine Jenkins valves by the "Jenkins Diamond Mark." —*Look for it—demand it.*

JENKINS BROS.
New York Philadelphia Chicago
Boston Montreal London

Jenkins Valves

Trenton, N. J.; second vice-president, James F. Conran, Standard Sanitary Mfg. Co., Pittsburgh, Pa.; treasurer, Martin Behrer, Behrer & Co., New York; secretary, Frank S. Hanley, New York. Board of directors: the president, vice-president, the treasurer and P. J. Faherty, Lambertville Pottery Co., Lambertville, N. J.; C. W. Fell, W. A. Case & Son Mfg. Co., Buffalo, N. Y.; F. W. Hubbard, W. B. Hubbard & Sons. Co., Boston, Mass.; George E. Keenen, Bayonne Supply Co., Bayonne, N. J.; John A. Murray, John A. Murray Co., New York; F. P. Stevens, Plimpton & Hills Corporation, Hartford, Conn.; and A. A. Tomlinson, Virginia-Carolina Supply Co., Norfolk, W. Va.

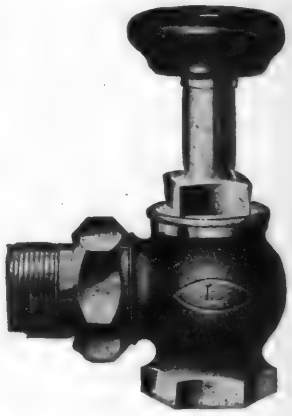
National Counselor to Chamber of Commerce of United States; Guilford R. Adams, Samuel Sloan Co., Rochester, N. Y.; Substitute, Claude Owen, E. G. Schafer & Co., Washington, D. C.

National Committee representatives: John A. Murray, DeWitt Cook, A. B. McLeod, J. A. Messer and H. W. Thorndike.

The association went on record as favoring the immediate return of the railroads to private ownership to be operated under a system of federal regulation. Favorable action was also taken in connection with the proposed National Budget System. Finally the association endorsed the stand taken by the steel companies to "maintain the American system of the open shop." Addresses were made by W. G. Cowles, vice-president of the Travelers Liability Insurance Company on "Employers' Liability Insurance"; and by Dr. Franklin H. Giddings, of Columbia University, on "The Industrial Unrest and Common Sense." In discussing business conditions it was the consensus of opinion that the production will not keep up with the demand for some time to come. Manufacturers of enameled ware are four months behind in their orders. Soil pipe and fittings are sold out, while production is at about 60% to 70% of capacity. The steel strike will serve to maintain at least the present prices for some time to come. Brass manufacturers are from four to six months behind in orders.

London, Eng.—Of the half million houses called for in the British government's housing scheme within the next three years, between 7,000 and 8,000 are already under construction, while plans are being submitted for 80,000. The hope has been expressed by a British government official, says the American Chamber of Commerce in London, that 100,000 would be built by the end of 1919. The total expenditure is estimated at $1,675,000,000

For Your Own Good



Lavigne Packless Quick-Opening Steam Radiator Valves

for the good they can do on your good jobs because of the good principle and workmanship which is built into every valve.

They are BUILT RIGHT—TO STAY TIGHT.
They positively do not leak Water, Steam or Air.
They open quickly and close just as quick.
They are an ornament and a faithful servant to any job.

Made in six sizes, many styles of handle.

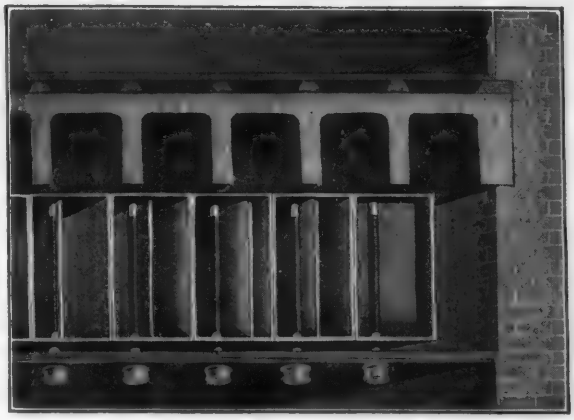
All good jobbers have them

COMMONWEALTH BRASS CORPORATION, Detroit, Mich.

Please mention THE HEATING AND VENTILATING MAGAZINE *when you write.*

This Illustration Shows How the Perfecto Damper Regulator and Indicator

when placed on a battery of ducts in the collecting chamber near the machinery room not only affords an easy and convenient means of regulating the flow of air, but also serves as a positive means of indicating the room to which each duct leads, by means of the numbered or lettered cover windows.



Send today for Descriptive Circular

THE SIXTH CITY SHEET METAL WORKS CO., Cleveland, O.
Galvanized Iron Work for Heating and Ventilating Systems

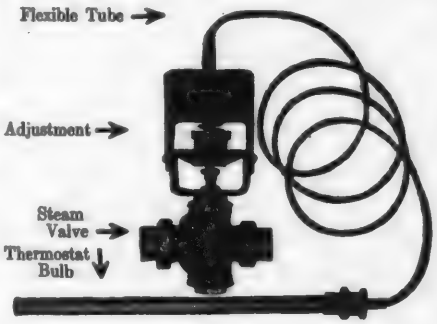
Make Better Use of Man-Power

Help relieve the labor situation by urging manufacturers to put machines on the automatic jobs, releasing men for the work machines can't do.

Help further by showing how automatic *heat control* saves labor, material, and time; improves results and increases output.

Get posted on the possibilities of automatic heat control for industrial processes. It's one of the live issues of the day.

The Powers Regulator Company
Specialists in Automatic Heat Control



No. 11 REGULATOR is entirely self-contained, requiring no air or water pressure for operation. Automatic, reliable and accurate. Peculiarly adapted to the control of water cooling, steam cooking, pasteurizers, acid baths, glue heaters, hot water tanks, etc., etc. Ask for Bulletin 129.

POWERS BULLETINS

These Bulletins contain much helpful data on automatic heat regulation as well as descriptions of Powers Regulators.

They should be in your files. We'll gladly send them on request.

954 Architects Bldg., **NEW YORK**
2143 Mallers Bldg., **CHICAGO**
365 The Federal Street Bldg., **BOSTON**
The Canadian Powers Regulator Co., Ltd., Toronto, Ont.

AIR CONDITIONING TRADE MARK

WEBSTER
Air Conditioning
Apparatus

FOR

Generator and Transformer Ventilation

is the subject of Bulletin No. 450 just off the press, which, in connection with Bulletin No. 540, entitled

Ventilation Systems for Steam Turbine Alternators

forms a most complete piece of literature on the subject.

In writing for copy please state whether you have or wish copies of Bulletins No. 50 and No. 120—

How to Specify Webster Air Washers

ATMOSPHERIC
CONDITIONING CORPORATION
Lafayette Building
PHILADELPHIA

for the half million dwellings, and is based on the present average figure of $3,350 per house. In spite of the tendency for building costs to increase, this figure will not be exceeded. The average rent charged will vary according to local conditions; the local rate payers will bear as much of the loss as is covered by a two cents rate, the tax payers meeting the rest of the bill.

Manufacturers' Notes.

Trane Co., La Crosse, Wis., manufacturer of the Trane line of heating specialties, announces that it is represented in northern Ohio by the Joseph Skeldon Engineering Company, located in Cleveland.

Crane Co., Chicago, Ill., has purchased a site in Pittsburgh, comprising 80,000 sq. ft., at a cost of about $25,000 on which the company will build a new plant.

Haynes Selling Co., Philadelphia, Pa., has established a direct sales office in New York, in the Flatiron Building, with Thomas M. Kellogg in charge. A district safes office has also been established in Detroit.

Williamsport Radiator Co., Williamsport, Pa., is adding two new buildings to its plant, each 75 x 200 ft., which will nearly double the plant's capacity.

Hoffman Specialty Co., New York, has appointed E. S. Storm as manager of the company's Chicago office. Mr. Storm is vice-president of the company.

Whitlock Coil Pipe Co., Hartford, Conn., is building a one-story machine shop, 48 x 71 ft., costing about $13,000, to take care of the company's increased business in feed-water heaters, pipe bends, etc.

Central Station Heating Notes.

Hillsboro, Ill.—In the hearing of the Southern Illinois Light & Power Company's petition to continue its present rates for steam heating service in Hillsboro until May 20, 1920, the petition was allowed by the State public utilities commission. At the expiration of that time, however, the utilities commision orders that the rates which the company charged in 1917 and 1918 shall become effective, unless a further order has been entered in the meantime.

Springfield, Ill.—Authority to increase still further its rates for steam heating in Aledo was denied the Illinois Northern Utilities Company by the public utilities commission in an order issued October 2.

"Sirocco"

TRADE MARK

Oakland City Hall
Oakland, California

Architects: Palmer & Hornbostel, New York City
Heating Engineer: H. C. Meyer, Jr., New York City

IN many cities the buildings belonging to the municipality and housing the municipal departments are a grave reflection upon the taste and judgment of those responsible for their appearance and arrangement.

The city of Oakland, California, however, is an exception. Here is a classic city hall, an example of the splendid architecture of the Golden West.

In keeping with the far-seeing arrangement for utility and healthful conditions in every section of the building, the "Sirocco" system of heating and ventilating has been installed. This means dependable service with healthful heating when needed, and a system of ventilation insuring fresh, clean air at all times.

If you are interested in any heating or ventilating proposition, we would like to talk with you.

AMERICAN BLOWER COMPANY

DETROIT, MICH.

Canadian Sirocco Company, Limited, Windsor, Ont.

Branches in all large cities

The company is ordered to continue in effect until June 1, 1920 the present rates and to resume on Sept. 1, 1920 the old rates in effect before the commission granted an increase. The company asked for an increase of 25% over the rates granted by the utilities commission when it increased the rates last year.

San Francisco, Cal.—Orders have been issued by the State Railroad Commission for every public utility company in the State that sells heat to file a complete rate sheet showing the schedule of charges. This order is to be complied with inside of thirty days. Under another order the commission requires from each utility a complete description of every angle of connection between the company and consumers.

St. Joseph, Mo.—The local central station heating company is asking all concerns using its service and who have independent heating plants to put them in condition for use if necessary during the reconstruction of the street railway power plant. In the case of the city hall, the plant has not been used for ten or twelve years. It is expected that the situation will result in a rush of repair work.

Carrollton, Ill.—Appeal from the 100% increase in heating rates granted by the State public utilities commission to the Central Illinois Public Service company of Carrollton has been filed by the city of Carrollton and customers of the company. The 100% increase in rates was granted the power company by the commission when a petition was entered asking the right to discontinue the heating service in Carrollton or else that the company be granted an increase in rates that would give a profit on the service. The commission at the hearing refused to permit the discontinuing of the service on the date specified, May 1, 1918, but ordered the company to continue its service until June 1, 1920. It granted the corporation, however, an increase of 100% on its 1918-1919 rates, to become effective September 1, 1919. The appeal is designed to secure the setting aside of this rate.

Colorado Springs, Colo.—Consumers of steam heat in the down-town business district are making a final effort to get action on the proposed operation of the steam heating plant of the Colorado Springs Light, Heat & Power Company through a co-operative agreement. As reported last

The Engineer of the Near Future

will be expected to know exactly what his client means when he says "I want Manufactured Weather for the entire building. I want to make 'Every day a *good* day.'"

If you are not yet familiar with Manufactured Weather I'll be glad to send you my new book, "Weather, and the Story of How it is Manufactured."

It's gratis, of course.

Write right now!

Carrier Engineering Corporation

39 Cortlandt Street NEW YORK CITY

Offices at
Boston Buffalo
Chicago Philadelphia

Yours to make
"Every day a *good* day"
The Mechanical Weather Man

Please mention THE HEATING AND VENTILATING MAGAZINE *when you write.*

Buffalo
Equipped
THE prominent buildings in all parts of the country are equipped with
Buffalo Heating and Ventilating Apparatus
It puts heat, mechanically, just where it is wanted, keeps it in circulation and prevents it from escaping through the ventilators in in the roof until it has been used to the best advantage. Saves coal—increases efficiency of workers.
Catalog No. 198-36 gives valuable engineering data on heating and ventilating problems and our engineering department is always available for consultation.
Buffalo Forge Company
Buffalo, N. Y.
Offices in all Principal Cities
"Buffalo"

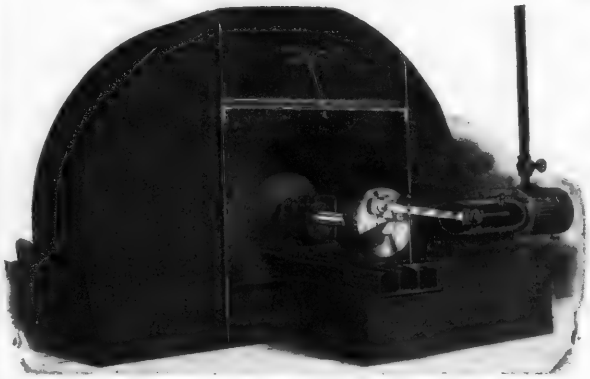
month, the Pikes Peak Consolidated Fuel Company and the Stark-Corley Coal Company had tentatively agreed to operate the plant but could not get a sufficient number of consumers to sign contracts for the service. It was then decided to build a municipal heating plant in the rear of the city hall to meet the emergency, while six business buildings were to be similarly equipped. Independent plants have actually been installed in the Antlers and Alamo Hotels. This left 32 other places of business without provision for heating. The light company announced last Spring that it would abandon its heating plant because of the annual deficit of $14,000 which it was unable to absorb. The company has a public offer to operate on a cost basis, or to lease its plant to responsible persons without profit.

In connection with the possible liability of the company in shutting down the plant an opinion has been given by City Attorney J. L. Bennett in which he quoted various authorities to show that the city has very little recourse under the franchise. In the original ordinance dated August 6, 1900, which granted a 20-year franchise to the company, the company was compelled, within four months from the date of the passage of the ordinance, to begin construction and, within 18 months, to enter upon the conduct of the business of furnishing steam heat. The ordinance then provides "and in default thereof all of the rights, privileges and franchises herein granted shall be and become forfeited."

Section five of the ordinance provided that "the said company shall not charge consumers more than $4.00 per heating year, viz: from the first day of October to the first day of June, for each 1,000 cu. ft. of space heated by steam or hot water . . . and shall supply to the city during each said heating year all steam required for heating, power and other purposes in the city hall building at one-half the company's average price to other consumers for the current heating year . . ."

Section six provided that the company should pay to the city certain percentages of its gross earnings, while section seven stated that "if the said Colorado Springs Electric company shall in any substantial manner fail to comply with the provisions of the ordinance, then and in that event the said company shall at the option of the city council, forfeit and surrender any and all further rights, privileges and franchises conferred or granted by this ordinance,

Heating Ventilation
Drying Air Washers
Engines Mechanical Draft



Let us make your plans and estimates

Get Catalogues 65-B and 67-B

OFFICES IN ALL PRINCIPAL CITIES

NEW YORK BLOWER COMPANY

MAIN OFFICE:
513 Transportation Bldg., 608 S. Dearborn St., Chicago, Ill.
Toledo, O.: Room 629 Nicholas Bldg.

WORKS:
Bucyrus, Ohio

Please mention THE HEATING AND VENTILATING MAGAZINE *when you write.*

Howard Theatre Bldg., Chicago, Ill.
Henry L. Newhouse, Architect.
Charles W. Ferguson, Owner.

Silence

THERE is something more than first cost, something more than efficiency, something more than operating expense, that makes Massachusetts Squirrel Cage Fans the choice of engineers for theatre ventilation.

That something more is SILENCE.

So well proportioned are these fans that the sound of rushing air through inlet and outlet is reduced to a minimum.

So rigidly constructed that the noises of material vibration are unheard a few feet from the fan.

In the Howard Theatre Bldg., Chicago, Ill., two Massachusetts Fans and Massachusetts Air Washers furnish clean, pure air without noise or vibration and at low cost.

MASSACHUSETTS BLOWER CO.
Watertown Mass.

NEW YORK BOSTON CHICAGO

Branches in 20 Principal Cities
throughout the Country 100-10

MASSACHUSETTS FANS-

and it is expressly provided and declared that no exclusive franchise or privilege is intended to be granted."

Mr. Bennett also points out that section eight of the ordinance provided that the company shall give a bond in the sum of $10,000 to the city, "conditioned on the payment to all persons, corporations, associations and the city of Colorado Springs of any and all damages which may be sustained by them, or any of them, for which the said company may be in law bound and held by reason by any act of neglience on the part of said company."

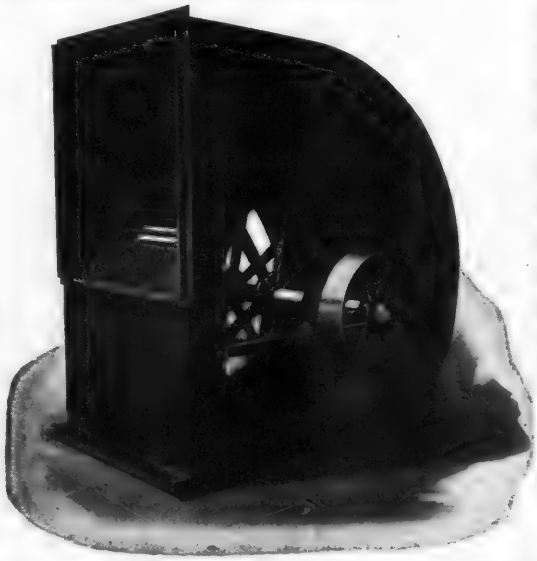
From this it will be noticed, as was pointed out by Mr. Bennett, that the ordinance did not expressly require the company to build and did not expressly require it to keep in operation, unless the provision in Section five providing that it would supply heat to the city hall at one-half the average price to other consumers, be so construed. It will also be noted that failure to do certain things within four months and failure to be operating within four months forefeited the franchise, but provided no other penalty, while failure to comply with provisions of the ordinance provided expressly for the forfeiture of other rights.

The company's franchise expires August 20, 1920. In explaining why the company decided to abandon its srevice at this time, Mr. Bennett stated that in 1915 an investigation made by the State public utilities commission showed that the steam heating plant was losing money and that the loss was being made up by the users of gas and electricity. The commission held that it was not fair to charge the losses of the heating plant to the electric and gas plants. The commission at that time made a reduction in such electric light rates so that it would reduce the earnings of the company to a fair per cent upon the valuation of the property as fixed by the commission, and stated that it had no jurisdiction over the steam property, because the legislature, in creating the public utilities commission, had not stated that the heating service was a public utility.

About a year ago the company began to notify its consumers that it was going to stop its heating service entirely and refused to furnish heat to any new consumers. Mr. Bennett states that he then made a careful examination of the law and reached the conclusion that the war being on, it was practically impossible for the different consumers to get heating plants installed for the following winter, and that the company, having operated for a time under the

Buckeye Multiblade Fans

are made especially for low pressure Heating and Ventilating work. They are giving perfect satisfaction.



CORRECT DESIGN. HEAVY CONSTRUCTION, NOISELESS OPERATION, WORKMANLIKE FINISH, HIGHEST EFFICIENCY.

Our Engineering Department is maintained for the purpose of assisting Engineers, Architects, etc., in planning efficient Heating and Ventilating Systems for all buildings.

THIS DEPARTMENT IS FREE TO YOU.

We also manufacture a complete line of Disc, Cone and Steel Plate Fans.

Write us

BUCKEYE BLOWER CO.

COLUMBUS, OHIO.

WESTINGHOUSE MOTORS and CONTROL for VENTILATING EQUIPMENT

The experience of the Westinghouse Company in furnishing electrical apparatus for ventilating equipment is represented by the thousands of horsepower of motors and control driving some of the largest ventilating installations in the world.

The results of this experience means the elimination of guess work in the installation of electrical apparatus and the securing of desired results.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Penna.

Sales Offices in all large American Cities

Westinghouse

Please mention THE HEATING AND VENTILATING MAGAZINE *when you write.*

franchise, was bound to carry on the business until the consumers had reasonable opportunity to put in their own plants and that they did not have such opportunity the first winter after this notice. As for continuing the service during the forthcoming winter, Mr. Bennett holds that the notice given by the company was sufficient for the individual to prepare to serve himself this year. Mr. Bennett adds that he does not believe the bond referred to in the ordinance covers this kind of a violation of the franchise, if there be a violation. Bonds are strictly construed and the provision is against negligence of the company.

New Firms.

Meyer & Valentine, engineers for heating, ventilation and power plant designs, composed of R. J. Mayer and F. H. Valentine, is the title of a new firm in Cleveland, O., with offices at 615 Bangor Building. Both are members of the American Society of Heating and Ventilating Engineers.

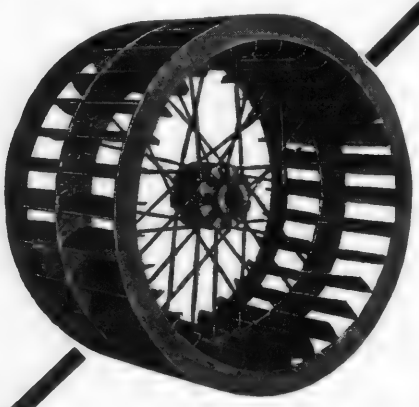
Chandler Service Corporation, 74-76 Ashland Place, Brooklyn, N. Y. announces that the service formerly rendered by the Chandler Engineering Corporation will be continued under conditions affording the Chandler organization greater resources and expansion along line in the industrial field. The corporation's activities will embrace research, development and production in the chemical, electrical and mechanical arts. In the corporation's engineering division, laboratories, drafting rooms and experimental shops are at the service of manufactures and others for the betterment of their products and the perfecting of new processes.

RIC-WIL Paint for Heated Surfaces

A brilliant black paint of superior preservative properties, dries hard yet is tough and elastic. It has a bond with clean metal that preserves its adhesion during contraction, expansion and bending.

Lasts Much Longer than the Average Coating.
Especially Good for Underground Heating Pipes.
Let us send You a Free Sample to Test.

THE RIC-WIL COMPANY, Cleveland, O.



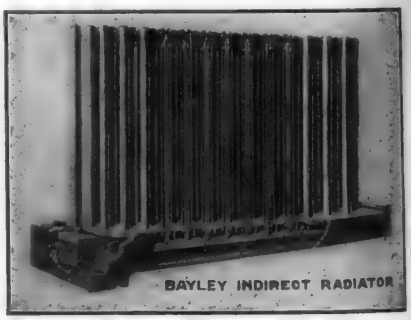
Bayley

—for Efficient Heating and Ventilation

Applied to modern heating and ventilating requirements, Bayley Equipment, as represented by The Chinook Heater and the Bayley Plexiform Fan, gives a KIND and LENGTH of service that makes it a highly profitable investment.

Our engineers will gladly aid you in planning heating installation for buildings of all kinds.

Write for descriptive bulletins, plans and estimates.



BAYLEY MFG. COMPANY
732 Greenbush St., Milwaukee, Wis.

Manufacturers of Heating, Ventilating, Drying and Exhausting Apparatus

Contracts Awarded.

F. F. Ziegler, Junction City, Kan., heating and plumbing new City Hospital building for $10,000.

Moore & Adams, Davenport, Ia., heating new Linograph Company's factory at Fort & Scott Streets, for $10,000.

Newberry Electric Co., St. Louis, Mo., was the low bidder, at $55,130, for the heating and ventilating equipment of the new Roe School, Mitchell and Prather Avenues, St. Louis.

New Incorporation.

Prudential Heater Co., Louisville, Ky., capital $50,000, to manufacture heating boilers. Incorporators: George Laib, Phil Laib and W. G. Probst, all of Louisville.

Central Heating Plant of Peoria, Ill., to Serve as Model for French City.

Peoria is to be the model on which at least one important city in France will build the plans for its central heating system. A representative of the French municipality of Nancy has been in conference with Engineer O. W. Kastens, of the Central Illinois Light Company and will take back to his own city the uniformation gathered as the basis for the construction of what will be there, in all probability, a municipal heating plant.

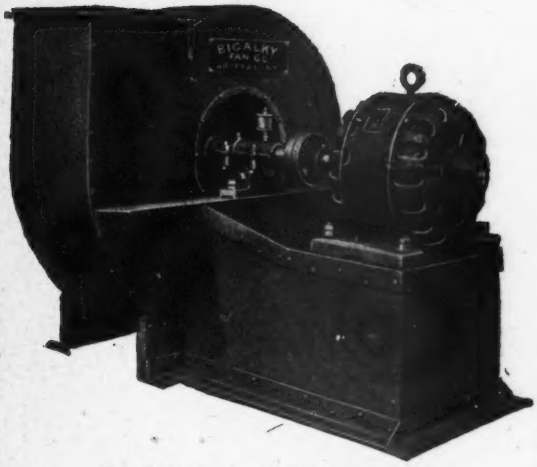
When the representative of the French city came to the United States to investigate the matter of central heating plants he naturally applied to the National District Heating association and was referred to Peoria where he could see the most modern methods in the fullest operation. Other cities will, of course, be inspected but it is generally conceded that in Peoria the business of heating a city from a central plant has been most rapidly and most satisfactorily developed.

A SMOKELESS CITY.

It is this development of a central heating system that has changed the complexion of Peoria. In 1902 the city could be found on the map of the Western hemisphere by the cloud of smoke pouring from her many chimneys. Today there are only two active smoke stacks in the business district.

Four miles of heat mains do the heating of all buildings within an area from the river to the bluff roughly bounded by Hancock street on the north; Perry, on the west and Oak street on lower Adams.

BI-CAL-KY



BI-CAL-KY FANS ARE GOOD

FANS
DUST COLLECTORS
DUST ARRESTERS
AIR WASHERS
ROOF VENTILATORS

Our engineering department stands ready at all times to assist you in securing orders and in making installations. Feel free to write us of your engineering problems.

We solicit your inquiries and assure you of our co-operation.

HERSH & BROTHER
[Successors to Bicalky Fan Company]
Main Office and Factory
Allentown, Pa.
951 Niagara St. Buffalo, N. Y.
Perry Bldg. Philadelphia, Pa.

Please mention THE HEATING AND VENTILATING MAGAZINE *when you write.*

Peoria now stands among the first cities in the country in the matter of central heating. The engineers say that while there are larger places with more length in heat mains, there are few if any that rank higher in square feet of radiation or actual amount of space heated.

Mr. Kastens, the engineer now in charge of the work of extending the system, very modestly refuses to take the credit for the efficiency of the plant. He declares that the system was worked out by H. R. Wetherell and J. A. Strawn. These men saw the opportunity here for demonstrating the advantages of a modern equipment and have kept every phase of the service up to date.

HEATING BUSINESS DEVELOPS.

The story of the development of Peoria's central heating plant is an interesting one. Like many another place, at first, there was no thought but to use exhaust or waste steam from the light plant for this heating work, but as the demand grew, it became evident that there was not going to be any adequate supply of exhaust steam and the company had to begin planning for a larger supply. This meant the installation of an entirely new set of boilers and the re-arrangement of the plant so that now the heating of the city has become a business in itself.

Recently-Enacted Building Legislation.

Two important pieces of legislation affecting contractors were passed by Congress recently, one providing "relief" for contractors on government contracts affected by war conditions and one relating to the construction of army camps. In accordance with the latter law there will be no further holding up of payments on army camp construction as a result of the comptroller's interpretation of the Army Appropriation Act.

Federal Housing Agencies.

Abolishment of the United States Housing Corporation on the ground that it was intended only as a war emergency measure has been recommended to the House of Representatives. A new plan of solving housing problems is being advocated by Secretary of Labor Wilson which would result in the establishment of a permanent housing agency.

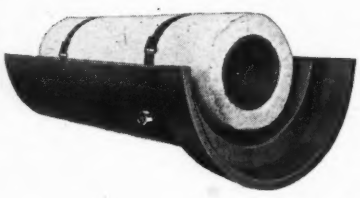
"There is no doubt," he says, "that the housing shortage in America will be more acute the coming winter than at any time in the history of the nation, and every effort should be applied to stimulate the building of homes and to assist communities in making available housing facilities in order that the hardships may be reduced to a minimum."

The proposed bureau would take over all the plans, data and reports of the Housing Corporation. During the war homes for workers were built at a cost of $110,000,000 and very complete data, etc., have been collected which might be used to the great advantage of many municipalities.

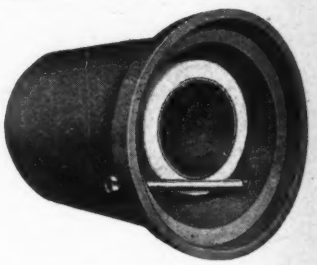
GOLD'S
THERMOSTATIC
HEAT REGULATING
SYSTEM

Operated entirely by ELECTRICITY.
Each room is a unit by itself.
Does not depend on an air compressor.
Requires no attention whatever.
Is free from all troubles which usually affect such devices.

GOLD CAR HEATING AND LIGHTING CO.
17 Battery Pl. (Whitehall Bldg.) New York



CANNELTON
PATENTED
CONDUIT
FOR
Insulating Underground
Steam and Hot
Water Lines



Made of Fire Clay, Salt Glazed and thoroughly Vitrified. Simple method of installation, greatest efficiency, and longest life make it the choice of leading heating engineers today.

Write for descriptive booklet

CANNELTON SEWER PIPE CO., Cannelton, Ind., U. S. A.

Please mention THE HEATING AND VENTILATING MAGAZINE *when you write.*

Fuel Oil Proposed for Heating New York Buildings.

In view of a possible shortage in the coal supply, the proposition has been advanced by Mayor Hylan of New York that the city's apartment houses, office buildings and factories be heated this winter by oil or colloidal fuel. At a recent meeting of the city's leading engineers and oil fuel experts from different parts of the country, held in the Municipal Building, at the instance of the Board of Standards and Appeals, the movement was endorsed and a tentative draft of rules drawn up governing the storage of fuel oils and the construction and installation of oil-burning equipment.

It is claimed that the use of fuel oil will mean a saving to the city of $200,000 a day.

William C. MacTarnahan, vice-president and general manager of the Fess Rotary Oil Burner, Inc., of Boston, who was in attendance at the meeting, deplored the cry raised by some that "fuel oil is as dangerous to tamper with as dynamite." He said:

"We operate 5,000 plants throughout the country. Ever since we began using fuel oil, about twenty years ago, we have had no explosion or anything that resembled a fire. Fuel oil is perfectly safe."

Fire Chief John Kenlon said he had studied the matter and felt certain the attendant danger in the utilization of oil for heating purposes was no greater than in the use of coal for the same purpose.

Capable Executive with $25,000 to $50,000 Wanted.

Additional capital required for factory equipment for manufacturing perfected article of real merit needed in practically every dwelling for heating purposes. Profitable business; very large field. Investor acquires liberal interest, may become active member of new organization now forming, and investment will be amply secured. Really excellent and most unusual opportunity for able executive of successful record, preferably sales-organization experience.

This General Trade Mark REG'D. TRADE MARK Tycos ROCHESTER, N.Y.

covers all indicating, recording and controlling instruments made by this company and is a synonym for standard apparatus—precision, reliability and permanence.

We invite, from all interested industrial managers, correspondence relating to our instruments and their uses.

Our stock models cover every usual industrial requirement, with very moderate outlay.

Taylor Instrument Companies

Rochester, N. Y

There's a Tycos or Taylor Thermometer for Every Purpose

353

Please mention THE HEATING AND VENTILATING MAGAZINE *when you write.*

INTERNATIONAL

ECONOMY BOILERS

Tested and rated in accordance with the Code adopted by the American Society of Heating and Ventilating Engineers

In the design of this Boiler, nothing has been taken for granted. Every detail that promotes boiler efficiency has been carefully considered and tested under varying conditions of service. The result is a boiler that is truly entitled to the name ECONOMY.

Special Features of the Economy Boiler

Large ashpit—no connecting bars.

Side draft door.

Grate bar connection outside the ashpit.

High crown sheet—permits deep fuel bed.

Special provision for thoro mixing of gases to promote complete combustion.

Steam dome so designed as to deliver dry steam.

Send for catalog 1296-H describing boiler in detail

INTERNATIONAL HEATER CO.
UTICA, N. Y.

Only men of character and proven ability considered. Address in confidence, General Manager W., care HEATING AND VENTILATING MAGAZINE, stating experience and previous connections in detail.

Wanted—Heating, ventilating and power draftsman, with several years' experience in laying out industrial plants, for position as head draftsman. Apply by letter, stating in detail experience and salary expected, to Geo. D. Farnham, chief engineer, The McCann-Harrison Co., 621 Sloan Bldg., Cleveland, Ohio.

Position Wanted.—By young man, age 26, with several years' experience in heating and ventilating work. Will consider the sale of boilers, radiators, special heating system or work in contractor's office. Full details upon request. Address Thompson, care of Heating and Ventilating Magazine.

Position Wanted.—Heating and ventilating engineer with 14 years' experience in all branches of the business, will consider a new position where the compensation is equal to his qualifications. Broad experience in school building work, also in the design and superintending of various systems and very large installations. References and complete information will be furnished to any reliable concern interested. Address Castleton, care of Heating and Ventilating Magazine.

Surface Barometric and Jet Condensing Equipments for Power Plants.

Main, Auxiliary, Distilling Condensers and Evaporators for Marine Service.

Distilling Condensers for Refrigeration and Chemical Plants.

"Crosshead Guided" Expansion Joints.

Ross Boiler Feed Water Heaters.

Ross Oil and Sugar Juice Heaters.

Gravity and Forced Circulation Heaters.

Ross Oil, Air and Water Coolers.

ROSS HEATER & MFG. CO.
BUFFALO, N. Y.

THE BRAND THAT LEADING ENGINEERS DEMAND